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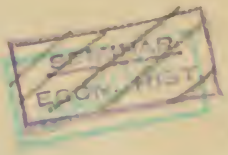

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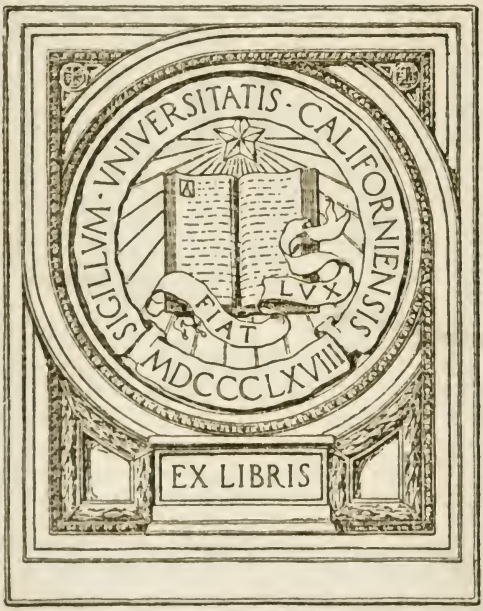

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A

TREATISE

ON THE

POLITICAL ECONOMY

OF

RAILROADS;

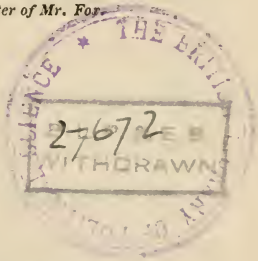
IN WHICH

THE NEW MODE OF LOCOMOTION IS CONSIDERED IN ITS INFLUENCE UPON THE AFFAIRS OF NATIONS.

BY

HENRY FAIRBAIRN.

"Through a long succession of generations he had been the progenitor of a virtuous and able citizen; who by force of the arts of peace, had corrected governments of oppression, and suppressed wars of rapine."—*Burke,—Character of Mr. Fox.*



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PREFACE.

THE importance of the railroad system is now so fully established in the estimation of the people of this and of all other nations to whom the scientific inventions of Great Britain are transmitted, that arguments are no longer required in support of the general advantages of iron roads. The object of the present work is, accordingly, to attempt the establishment of the system upon the most economical, durable, and least hazardous foundation, and to exhibit also the extraordinary consequences which the right application of this new mode of intercommunication will probably produce upon the whole future condition and prospects of mankind. So

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great have been the revolutionary consequences which have arisen from the invention of the steam-engine, and from other scientific discoveries at first apparently unimportant in their operation, and so vast has been the accumulation of wealth which England has derived from these applications of the simplest materials of which the universe is composed,—that we now perceive that the ascendancy resides in the nations distinguished by commerce alone; and, turning with contempt from the records of the battles and victories of former times, we acknowledge that science has become the distributor of all power. Other nations are daily becoming more confirmed in corresponding views of the superiority of the arts of peace, and the new mode of facilitating the intercourse of the people of neighbouring countries has certainly been discovered at a most fortunate period in the changing sentiments of mankind. The projects which are contained in the following pages, for connecting Scotland

with Ireland, and England with France, by railways over the seas which now separate us from those countries, would have been mere visions of the imagination to the people of any preceding time; but it has now become acknowledged that the interests of countries are not less similar than the interests of towns; that to be divided by the sea is not different to the minor divisions by mountains or by rivers, and, therefore, not the policy, but the practicability of thus consolidating the interests of nations, will become the only object to be considered at some very early period of time These portions of the work were formerly published in the United Service Journal, and were received with a degree of favour both in England and upon the continent, which has induced the writer to extend his observations upon those projects in the course of the present work. That such propositions should be adopted immediately is certainly not to be supposed ; but the accumulations of population, capital, and com-

merce, which the abandonment of war will have a tendency to create, will now furnish the means for the accomplishment of designs which could not be undertaken before the cessation of that waste of the resources of nations which at length has come to pass. The facilities of communication by the introduction of railways will very powerfully hasten the oblivion of all national animosities; and so much is the writer impressed with the value of the system in its tendency to banish the envy and uncharitableness which hitherto have been the prevailing sentiments amongst the nations, that he does not hesitate to acknowledge his belief and desire that England will not remain a colossus amongst the modern states,—but that the diffusion of wealth will become more universal, and that the means of acquiring the blessings of existence be equalised all over the world.

The proposal for the employment of the present turnpike roads as the sites of the new roads, if adopted, will be injurious to the in-

terests of many speculators in the railroad projects, which are intended to be carried on by incorporated companies; but as these appear to the writer to be projected upon a foundation so dangerous to the future interests of the country, the prevention of a greater, must be the apology if the present proposition should occasion some present, loss.

The railroad system has been yet so little unfolded in its mechanical, commercial, or political operation, that much must be left to conjecture in works which are published upon it in its present stage; and should inaccuracies appear in any of the calculations in the following pages, it is to be hoped that the general correctness of the principles and outlines will outweigh those smaller errors which may be reasonably expected to occur in discussions upon a subject so little developed at the present time.

London, February 5th, 1836.

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THE

POLITICAL ECONOMY

OF

RAILROADS.

CHAPTER I.

Objects of the present work—Importance of Railroads—Proper mode of constructing them considered—The general principles of joint-stock companies explained—Individual enterprise preferred to the operations of great incorporated bodies—Expenses of joint-stock companies frequently fatal to their profitable existence—Superior advantages of private capitalists—All commercial legislation should be avoided—Companies for the formation of railroads shewn to be not an exception to the general rule.

The new mode of locomotion by iron railways is so remarkable an invention, and promises to bring forth changes so extraordinary in the affairs of all civilized nations, that contributions to our knowledge of the principles upon which it has its foundation will be appreciated by all who are aware of the importance of giving a just direction

to a system which already is perceived to be amongst the most magnificent scientific phenomena of modern days.

The present work has, therefore, for its object, — to go forward to the future, in preference to dwelling upon the past,—to point to the many dangerous errors which are about to be committed by the shareholders in the almost innumerable crowds of joint-stock companies which are daily coming into existence,—and to explain the commercial and legislative principles which are applicable to the system, and without a comprehension of which, this most valuable invention is in danger of being smothered in its rise.

The material mechanism of railways has been so abundantly set forth in the many valuable works which have appeared since the opening of the Manchester and Liverpool railway has given a stimulus to inquiries upon this subject, that it is proposed, in these remarks, to pass over that portion of the ground, and to proceed to the first step in our inquiry into the Political Economy of Railroads, by an examination of the principles upon which joint-stock companies, for any purpose whatsoever, can have any just foundation, when viewed in connexion with the circumstances of the present age.

Joint-stock companies, when incorporated by acts of parliament, are usually treated by political economists as coming under the order of mono-

polies; and the principles of monopoly have been described, by the author of "The Wealth of Nations," in a manner so clear, that it is difficult to comprehend how the track of legislation has been lost, as exhibited in the numberless incorporated bubbles of recent years. According, then, to those principles of legislation, which are derived from the order of all natural justice, each subject of a state is entitled to an equal opportunity of employing to his own advantage, and consequently to the advantage of the state, his own labour, enterprise, capital, and skill; and any violation of the commercial rights of individuals can be justified only on the ground of some overwhelming necessity which has arisen to the state. Following this reasoning, it is found that monopolies, or acts of incorporation for joint-stock companies, can only be granted to favoured individuals, in return for some corresponding advantage so rendered to the whole community; and this advantage must be indispensably necessary to be obtained,—and such as cannot be achieved by the individual skill, capital, and labour of the subjects of the state. The only description of undertakings which the author of "The Wealth of Nations" could find, in his own day, to possess these characteristics for incorporation, he describes as limited to three:—companies for the formation of roads, harbours, canals, —for banking institutions,—and for insurance

against fire and death. But, limited as this number of just incorporations may appear to be, it is not to be altogether surrendered that even those, in the times of our illustrious economist, were in reality well-founded exceptions to the general rule; for the roads, harbours, canals, banking institutions, and offices of insurance, in an age of less extended commerce than the present, were only required upon a scale which corresponded to the wealth existing in the hands of individuals; nor has there ever wanted a Duke of Bridgewater to construct canals from the resources of his own fortune; nor private bankers, with a sufficiency of capital for the accommodation of all the purposes of trade; nor individual underwriters, who could pay for the most valuable cargo that ever has been lost upon the sea. But whatever the necessities of former times may have rendered expedient with regard to the incorporation of joint-stock companies, it is at least certain that the modern immense accumulations of capital render the efforts of individuals quite equal to the accomplishment of the grandest designs which have arisen with the extending commerce of the present day.

And not only upon principles of equity and equality, but upon those of expediency and economy of management, it is for the benefit of states that privileges and acts of incorporation should be very sparingly dealt out. For great incorporated institutions are more complicated, unma-

nageable, and expensive in the machinery required for their direction, and more subject to the losses which arise from waste, indifference, and fraud, than the smaller establishments carried on by individual subjects of the state. This arises out of the principle of self-interest and self-preservation; since an individual,—whose whole fortune is embarked in his occupation, and from the well management of which he must derive his subsistence, or from the ill-management of which that subsistence will be endangered or destroyed,—will usually conduct his affairs with more economy, vigilance, and skill, than any great incorporated body of proprietors, whose numbers are too large, and whose individual interests are too small, for the requisite attention which is wanted for success. Indeed, great numbers of subscribers to joint-stock companies engage in such speculations, not for the fair indemnification to arise in the shape of interest for their capital employed, but for the plunder of the rest of the subscribers, in the shape of the unduly salaried idleness of directors, secretaries, solicitors, contractors, parliamentary agents, and the whole supernumerary rabble who clog the operations of all such great incorporated jobs. This natural tendency of such institutions to mismanagement, waste, and early annihilation of the capital of unsuspecting speculators has been seen in the melancholy history of the bubble institutions of the year 1825. Had the le-

gislature borne in mind the very alphabet of political economy, scarcely one of all those schemes would have ever been allowed to see the day, for no other purpose than to send thousands of innocent speculators, in the words of a celebrated writer of the time, to the gaol, the workhouse, and the grave. For these companies were incorporated for purposes which could be abundantly well achieved by the capital of individuals, and were not indispensable to the welfare of the state; since many of them were companies for washing, baking, milking, and almost all the very simplest operations of ordinary life.

Let us examine the operation of such institutions, in the history of the Steam Washing Company, which established itself upon the Isle of Dogs.

Here it is seen, that all the privileges and powers of the company could not prevent them from being underwashed and ruined by the individual washerwoman, at her own unincorporated tub. For the washerwoman at Kensington had no directors, secretaries, engineers, and other supernumeraries to employ; she had no large annual sum to lay aside for the payment of the costs of passing a bill through the houses of parliament; no house in a conspicuous situation, and at an enormous annual rent; no Ottoman sofas, silver candlesticks, and Turkey carpets, for the furniture of this house; and no dinners for the directors, consisting of turtle

and champagne. Thence the individual washerwoman could achieve clean linen at a much cheaper rate than a company, which could only act under such loads of superfluous expense: and thence the annihilation of the capital, and ruin of the happiness of thousands of speculators, in that and the numberless other similar institutions which went down after the bulk of the capital had been swallowed up by the projectors of the schemes, was attributable only to the error of a government, which, in endowing them with privileges, immunities, and irresponsibility beyond all other subjects, was guilty of a broad violation of the clearest principles of all commercial law.

Having thus cleared the way to the subject more immediately before us, and having seen the disastrous consequences of the errors of former years, it is next to be discovered whether railroad companies are not liable to similar objections as the companies for washing, milking, and baking the bread of the subjects of the state.

That railroads are of the greatest importance to the welfare of the community, and indispensable to be possessed by this country for the purpose of maintaining an equality of advantages with the neighbouring nations, is certainly most true; but it is not a consequence, that private individuals cannot undertake the construction of such works. The canals of the Duke of Bridgewater were completed from one fortune, at a time when that for-

tune was not of one half of the value of such properties in the present day; and, not to confine ourselves to the ranks of the aristocracy, there are numbers of individuals who have been able to invest such sums as 100,000*l.* in the railroad, now in the act of construction, from London to Birmingham alone. Let us, therefore, suppose that a private company of such capitalists should determine upon forming a new line of railroad from Manchester to Liverpool, in opposition to the present joint-stock line. The distance is thirty-two miles, and allowing that the land could be obtained by private purchase, or even that a circuit of some miles were rendered necessary by the opposition of some of the proprietors upon the route, still this private company, by avoiding the great outlay for parliamentary expenses, and for the salaries of directors and other officers, and availing themselves of the improved method of constructing railroads which have arisen out of the experience of those whom they would be about to oppose, would probably be enabled to complete their undertaking at less than one quarter of the cost of the joint-stock line. By the purchase of portions of the old turnpike road, and the avoidance of superfluous expenses for Ionic columns and other ornamental pieces of workmanship in the bridges, viaducts, and warehouses required, with that general attention to economy which individuals will always exercise in these speculations,—it is

probable that a private company of three capitalists could complete a sufficient railway communication of thirty-two miles, at 4,000*l.* per mile, or less than a sum of 128,000*l.* for the whole distance of thirty-two miles. Our knowledge of the costs of the private railways at the collieries in the north and still more that the canals of the Duke of Bridgewater were all executed at a cost of little more than 1,000*l.* per mile, renders a sum of 4,000*l.* per mile an abundant allowance for the construction of a railroad through even a very expensive portion of the kingdom. But, on the other hand, the railroad of the joint-stock company already in existence was constructed at a cost of not less than 800,000*l.*, or 25,000*l.* per mile, which is more than five times the sum that a company of private adventurers would probably require for the construction of a railroad thirty-two miles long. The private company would, moreover, be managed at one half of the annual cost for the joint-stock line; and, with all these advantages, would be enabled to convey merchandise and passengers from Manchester to Liverpool at one-sixth of the charge. The consequence of this change would be, that total ruin would fall upon the joint-stock line: nearly one million, originally invested in it,—and another million, which has been added in the purchase of shares, which have risen to about one hundred per cent. above par,—all would be wasted and destroyed, and grass would grow upon a road

which now is apparently in the full tide of prosperity, and the pride and glory of the world.

In this conjuncture, the government would be implored, by the shareholders in the joint-stock line, to interfere, to prevent the construction of the private line. But this prevention of the formation of a cheaper road from Manchester to Liverpool, would virtually amount to an addition of four hundred per cent. upon the cost of transportation between these two great mercantile towns; and, as other manufacturing districts and nations would possess railways and locomotion at the cheaper rate, the advantages of cheap transit would be lost to the manufacturers of Manchester and the merchants of Liverpool, through this violent upholding of a monopoly of the carrying trade. It would, therefore, be a cheaper method of overcoming the consequences of the first mistake,—not to commit a greater, by taking away ten times more capital in forced resistance to the prosperity of Manchester and Liverpool, which such a measure would create,—but rather to purchase, out of the treasury of the country, the whole of the stock of a company which will thus have fallen into ruin through the want of foresight in the government alone.

Nor is there any doubt that individual enterprise will soon be directed to the formation of such works. Though no one capitalist should possess the means of forming a line of railroad of

hundreds of miles in length, yet a chain of such capitalists would very easily complete such an undertaking, by dividing the line into individual proprietorships of the road from town to town. The opposition to the sale of the required land would also very rapidly disappear; for amidst the falling of rents, and general agricultural distress, the self-interest of the landed proprietor will very soon turn his opposition into the most ardent support of undertakings which would double the value of his estate.—With a better knowledge of the advantages of the system, the opponents of railways will become few and far between.

From these principles and calculations, it is seen that all commercial legislation is an evil that ought to be avoided; that no act of Parliament, for the furtherance of any enterprise, trade, or commercial purpose whatsoever, should be allowed to be passed; and that railroad projects are not an exception to the general rule.

CHAPTER II.

The common turnpike roads the true sites for the formation of railroads—Practicability of constructing them on the present roads—The traffic not impeded during the formation of the tracks—Suspension railways proposed—Plates exhibiting the proposed new system—Saving of property by the use of the present roads—Costs of parliamentary bills—Surveys and other expenses saved—Saving of property in inns—Mortgages upon tolls and other investments on the present roads prevented from being lost—The sites of the turnpike roads in every respect to be preferred.

As joint-stock companies are not an approved method of bringing the railroad system to that perfection which the national economist must desire, it is proposed, as the next step in this inquiry, to point to the existing common turnpike roads, as the most eligible lines upon which the foundation of the system should be laid.

It has not been sufficiently considered, that the improvements in road-making, during recent years, have caused the levelling of hills and shortening of distances, almost to the most direct lines and levels that possibly can be found. Upon these ready-made lines of road, it would therefore be the most obvious policy to commence the intersection of the kingdom with the railways; for the

laying down tracks of iron is not comparatively a much greater improvement upon the present Macadamized roads, than Macadamized roads were upon the rude roads of former times; and, indeed, the substitution of iron tracks would appear to be the next and most natural and gradual improvement of common turnpike roads. Thus there is abundance of room for the construction of single tracks upon either of the sides of the present wide and magnificent North road; and waggons might travel to and fro, and yet not impede, for the present, the travelling of carriages, mails, and waggons, upon the centre of the road. Or, if the roads were required to be widened for the trial of the new system, and for the avoidance of interruption to the traffic during the progress of the work, still the turnpike roads present immeasurably the cheapest lines of road.

For here would be no new purchases of land, and no parliamentary expenses; no invasion of estates, and destruction of immense masses of property in the inns and other appurtenances of a great mercantile road. Were the commissioners of the turnpike roads to commence by laying down one track upon either side of the road,—then, not only would the cost for new land and for parliamentary proceedings be avoided,—but no engineers, consulting-engineers, secretaries, assistant-secretaries, with solicitors, directors, standing counsel, and takers of gradients, termini, and

levels, would be required; and thence, the various lines would be constructed at one-tenth of the expense, and the price of locomotion be in a corresponding degree reduced to the people at large, by the nullification of the joint-stock schemes.

Indeed, the incalculable waste of property which is threatened upon the present turnpike roads, is a very powerful reason why parliament should pause upon the entertainment of all joint-stock schemes.

An individual possessor of property cannot certainly be protected in its enjoyment against the experience, enterprise, capital, and skill of another individual of the same community; and, therefore, if individuals construct railroads which shall destroy the property of other individuals upon turnpike roads, it is one of the ordinary misfortunes of an age of rapid progression in inventive science; but the advantages to the nation must be shewn to be very overwhelming indeed, before a just government would endow bodies of other individuals with privileges and powers which should operate to the destruction of the livelihood of individuals who possess inns, farms, and establishments for coaches and waggons upon an old-established line of turnpike road. Upon this ground, it is difficult to be seen how landed proprietors, whose property is taken away for the construction of new lines of road, should be more entitled to compensation than the

owners of inns and farms, whose properties are equally taken away, in being rendered valueless by the new railroad line. If it be for the benefit of trade, and therefore for the benefit of the state, that bills should be passed for the formation of lines of road through the lands of individuals,—so the same benefit derived by the state should, upon just principles, direct that compensation should be made for the equally forced loss of property in inns, farms, and other appurtenances of the road, which the law, for the benefit of the state, has compelled to be destroyed.

This is, then, the most economical plan upon which the railway system can be allowed to unfold itself. The land is already purchased; and where not already levelled, levels may be made at a comparatively small cost; and the labour of our ancestors having given to us the sites, it would be folly to lay void these roads for the purchase of new land, for purposes which the old will serve equally as well. Then the debts upon the present roads would be saved from being lost by the diversion of the trade to the proposed new lines; to which being added the salvation of the inns, and other valuable appurtenances of the present lines, with the saving of the capital which must be invested in new inns upon the new lines, and the saving of the property in the new railroads, inns, and appurtenances,—which will be in danger of being again

laid waste by future private competition,—the hazard of all this massacre of property is so imminent, as to lead to the necessity of a pause in legislation upon the subject, if not to the closing of the doors of parliament upon all seekers of bills for the various joint-stock schemes.

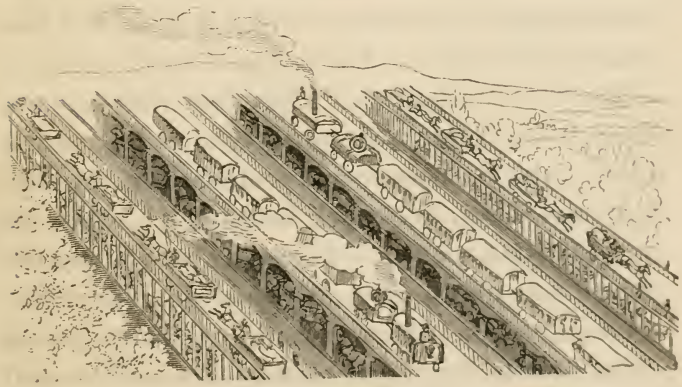
Having, then, established the true sites for railways to be upon the present turnpike roads, it is proposed, in the following engravings, to exhibit new views of the construction of the works.

In PLATE I, is a view of the present great North road, and upon either of the sides is a single track of iron road—the waggons drawn by horses and confined to the proper side of the road, whether travelling to or fro. In the centre is seen a mail coach and horses travelling without interruption upon the present turnpike road, and in the act of being passed by another with equal facility as at the present time. The average width of the great North road and of the other principal roads of the kingdom is about thirty-five yards, and the width of two mail coaches abreast is about sixteen or eighteen feet; and thence coaches or waggons and horses could pass and yet abundance of space be allowed for either of the tracks of iron road to be taken from the present width. Thus no interruption of the usual traffic would take place during the construction or after the opening of the railway tracks; or, if the present width of the turnpike be not sufficient for these purposes,

PLATE I.

PLATE II.

PLATE III.



the throwing down of the hedges upon only one side of the road would yield the required breadth, and be attended with but very inconsiderable cost. By this means we lay the first foundation of the system upon any common turnpike road.

In PLATE II., the same road is exhibited, but with the addition of the suspension railway above. This superincumbent structure is shewn to rest upon a series of iron pillars and braces, immediately upon which the rail is made to rest; and the carriages being constructed with wheels upon the principle which throws the weight upon the axle, the chief weight of the waggon and load is thrown upon the centre of strength in the iron pillars. The track upon which the horse moves is constructed of wood, as upon suspension bridges, that being the lightest material to be be used, where the economy of weight is to be sought. The distribution of the weight upon the suspension railway is, therefore, such as to produce the minimum of pressure, and therefore, the minimum of strength and of expense for the work of which it is composed. Thus two railways are obtained upon the same quantity of land, and the railway above covers in and protects from the rain, dust and snow, the track beneath it; whilst its own elevation secures it from dust, and allows the rain to flow off by spouts to be placed at intervals, similar to the scuppers of a ship. Projecting from either side of the upper railway is a walk or sort of balcony for foot-passengers. This widens

into a stage at an interval of each seven or eight miles, for the purpose of changing the horse, and of lighting, tending, and repairing the general body of the work. For foot-passengers this walk will be at all times dry. The waggons are seen passing at a speed of twelve or thirteen miles an hour, conveying passengers, mails, and light articles of merchandise. This portion of the road is to remain upon the present plan, since the carriage of passengers and goods at the rate of twelve miles an hour, and at a charge of less than one quarter of the cost for locomotive steam-engines, will probably be sufficient to continue to that department of the work a large portion of support. When passengers shall be enabled to travel at the rate of thirteen miles an hour, or from London to York in fourteen hours, it is probable that the saving of three quarters of the fare will more than counterbalance the saving of one-half of the time, by a steam locomotive engine at twenty-six miles an hour, or double the speed of the horse. But though this portion of the work should be deserted for the steam-track which is about to be constructed, yet its utility will remain for the conveyance of merchandise alone.

In PLATE III. is seen the completion of the system by the covering of the whole site of the road with railroad-tracks; for the completion of the first suspension-railway, in the preceding plate, allowed the mail-coaches, private carriages, and

other rapidly moving vehicles to be transferred to that line; and thence the centre of the road no longer being required, the workmen were seen in the act of constructing the central works, which appear in the present plate. The tracks here consist of a double line of horse railroads below, with a double track suspended upon arches above, for the use of steam power. Locomotive engines are seen passing to and fro, and this portion of the work is supposed to rest upon a series of light elliptic iron arches, because a greater degree of strength is required for the support of a steam locomotive engine than for a single horse.

Here is gradually completed a series of lines which afford every degree of speed, the transit on no one track being impeded by that of another. The stream of trade is flowing continuously upon one track from, and upon the opposite one to, any given place. A double number of lines upon the ground is afforded, since the bulk of the traffic upon any road must consist of the carriage of goods; and those also travelling at the slower rate will occupy more time, and thence the road being more continuously filled, a greater space for that species of traffic is seen to be required.

What the cost of the suspension or arched railways would be, must depend upon local circumstances, and upon the cost of iron at the time and place of their construction. The expense would be very greatly diminished by the cheap trans-

port upon the first completed track, of the iron-work required for the whole of the railroads above. The arches, it is to be observed, are not the wide arches of a cast-iron bridge, but only, perhaps, one twentieth part of such width and expense; since arches of one foot in width would be sufficient for the foundation upon which the sleeper and rail are to rest, the whole weight of the locomotive engines and trains being thrown upon the axles and rails—the transverse flooring being also of wood, as in the former case. The centre arch will support two sets of sleepers and rails, and as the pressure upon an elliptic arch may be increased to any extent without injury to that most indestructible of all the positions of matter, the work would endure to the end of time. Perhaps, therefore, we may estimate the cost of such a work as being about one tenth part of a cast-iron bridge fifty feet wide; or, with the advantage of the cheap carriage of the iron-work, about 3,000*l.* per mile.

Should the traffic upon the line of railroad not render necessary a quadruple track for the conveyance of goods, then the centre of the road—upon the ground-plan—may be occupied for the purposes of steam locomotive power. The arched railway may then be added at any future time, when increased trade, and decreased expense in the price of iron-work, or other local circumstances shall lead to an extension and completion

of the work. The advances in the value of iron-work—which will probably be the consequence for a long time—upon the great demand for the materials of the new iron roads, may lead to a more economical construction of the arches by stone or other materials, which may abound or be readily conveyed upon the lines of road.

Here, then, we complete the introduction of the system of railways, without hindrance to the present traffic upon turnpikes—without the loss of the sites of the present roads—without the purchase of new land—without parliamentary costs—without the general machinery of joint-stock companies—in one quarter of the time, and at one quarter of the expense, since the sites have been provided by the labour of our ancestors, and therefore come to us without cost. It is probable, therefore, that no private railroad could be formed upon terms which would supersede the public railroads then formed at the minimum of expense. The double economy of the preservation of the present turnpike roads, is thus seen to be conclusive against the opposition of all joint-stock lines; and though the commissioners of the turnpike roads should not proceed to the formation of iron tracks, yet, as the Macadamized roads could not compete with railroads in cheapness of transport, even though the latter were encumbered with the expenses of joint-stock operations, and the trade and the tolls would thus be lost to the present

lines, the incumbrancers of the turnpikes would then be entitled to the property in the road. For the extensive improvements in road-making which have been produced in recent years, as seen in the levelling of hills, and shortening of distances, have caused very extensive debts to be incurred upon almost all the great turnpike roads; and though mortgagees have a security upon only the tolls of the respective roads, yet would equity compel the commissioners to use every exertion in their power to prevent the annihilation of the capital thus loaned. Therefore the sites of the then deserted roads would be compulsorily sold for the benefit of the creditors, and thus passing into the hands of individual speculators, the rails would in that manner be laid in opposition to the joint-stock line.

Perhaps the sale of the present lines would be the most truly economical mode of commencing the new operations in iron roads. For though the subdivision of turnpike trusts into distances of only a few miles in length, is a less evil than the system of centralization, which impedes all improvement in the roads of foreign nations, ye the utmost economy of transport could best be obtained by the operations of private individuals, and the whole of the turnpike roads of the kingdom would be very advantageously sold. As national property, the conditions of the sale might limit the toll to the minimum required for the

benefit of trade, though even that condition would probably be rendered needless by the competition of opposing lines. Were the tolls exorbitant upon the road to Manchester through Birmingham, the railroad through Oxford would be simultaneously open for the conveyance of passengers and merchandise; and therefore the principle of free competition would reduce to a fair level the average of all toll. Individual proprietors would also more zealously follow out the improvements in the construction of railroads, than would any unsalaried commissioners, whose self-interest is not engaged in the most economical management of the roads; and therefore the introduction of the system of private proprietorships in roads would produce, first, an immense amount of money, to the extent of many millions, in the sale of the fee, and afterwards in the more economical management of individuals, the utmost reduction in the cost of locomotion, and, therefore, the utmost benefit to the state.

Thus it appears, that the joint-stock schemes in the expenses required for their incorporation, for the complicated machinery indispensable to their management, and in the fear from the more economical effects of individual competition, are beset with difficulties and dangers upon every side.

CHAPTER III.

Some of the lines now in the act of construction examined as to their probability of success—The Greenwich and London railway—Its expensive construction, and little probability of its success—The Southampton and London railway investigated—Shewn to be premature, and not a beneficial line—The Birmingham and London, and Great Western railways liable to similar objections—Great losses anticipated from the many proposed joint-stock schemes.

As these remarks are intended for the prevention of future loss, it may be well that a few of the existing joint-stock companies in railroads should be next examined as to their individual claims upon the capital of the subjects of the state.

First, in order of time, is the Greenwich and London railway. This work is computed by its projectors to require an expenditure of 400,000*l.* for six miles of railway, or a sum of 85,000*l.* per mile. Without alluding to the expensive construction of arches of brick, or asserting that light iron work would have been of equal strength and greater durability, and one third cheaper in expense, it is apparent that under any circumstances whatever, no such a work can have the slightest chance to succeed. For the calculations as to the

number of passengers to be carried upon this line will be found to be very short-sighted in every department of the scheme. Were there to be in future this one railway alone from the metropolis as a holiday plaything for the people, then the expenses of such a work might probably be borne; but when railroads will at the same time be in existence from all the other entrances to London, the novelty will be divided amongst them upon equal terms; or rather the others not passing through so much expensive property, and therefore having been completed for one quarter of the cost of the railway from London to Greenwich, and having locomotive power upon equal terms will be enabled to carry passengers and merchandise at one quarter of the rate; for the Liverpool and Manchester railroad has been constructed at 25,000*l.* per mile, and the Southampton, Great Western, and Birmingham railroads are all estimated at a similar rate, and therefore passengers could travel nearly four times the distance upon any of these lines as upon a road which has been constructed at a cost of 85,000*l.* per mile. Passengers could be conveyed to Windsor upon the Western road, a distance of twenty-one miles at the same expense which must be incurred for only six miles of transport upon the Greenwich line. Therefore Greenwich will not only be not improved in attractions for passengers through the construction of its railway, but its present

advantages will be absolutely annihilated, when locomotion shall be more than 300 per cent. dearer upon its railroad than upon the other roads leading out of town. The calculations that the passengers would be diverted from the present turnpike road, have therefore no reference whatever to a future state of things, when other railroads shall be in existence and in superior advantages of competition for the trade. That the mass of the community will prefer those roads which are the cheapest in expense is certainly quite clear; for the desertion of the Waterloo-bridge for more circuitously placed bridges which procure the salvation of one penny, makes an unanswerable instance that negligence of small sums is not the characteristic of the great body of the people. These calculations are founded, however, upon the supposition that the turnpike roads should not be converted into iron ways, for should that system be introduced, the present road from London to Greenwich, from Westminster-bridge, is almost a direct line, and almost a perfect level, and could be covered with rails at one fortieth part of the whole cost of the present joint-stock line. Moreover, the estimate of passengers to be derived from the Thames has been totally annulled by the project of a railway to Blackwall, if even the whole stream of passengers from abroad does not centre at Dover or Gravesend; for all will avoid the ex-

pense and delay of water conveyance when railroads shall afford a conveyance at one-third of the expense, and with a saving of two-thirds of the time. Neither can the Greenwich railroad be a portion of the future line from Dover and Gravesend, since a cheaper mode of approaching the metropolis must be found than one which has been formed at a cost of 85,000*l.* per mile. Under all this accumulation of disadvantages and misfortunes, it is clear that this railway is amongst the most monstrous abortions that folly ever yet has caused to be brought into the financial world.

The Southampton and London railroad is estimated at a cost of 25,000*l.* per mile. Passengers from and to England and France would appear to be the chief dependence for its profitable support. But as lines of railway will soon be constructed from Paris to Calais, and from Dover to London, and the distance from Dover to London will be less than that to Southampton, with the advantage of a line to be constructed at one quarter of the cost of the present too early railway to Southampton, it is certain that there is little chance for a subsistence for the latter line. The passage from Havre de Grace to Southampton occupies usually a period of twelve hours, whilst that from Calais to Dover not more than about three hours, and though the difference of distance between Havre de Grace and Calais is now so considerable as to give

Southampton some opportunity as a thoroughfare from France, yet when a railway shall convey passengers from Havre de Grace to Calais at five times the present speed, and at one fifth of the present cost, it is probable that the saving of nine hours in time and the corresponding expense of the passage by steam, with the general aversion to the water by passengers of pleasure, will bring the whole of the intercourse between England and the continental states to centre at Dover alone. Thus the railroad to Southampton will be reduced for its livelihood to depend upon the trade of that watering-place alone, subject also to the hazard of opposition from future private competition at one quarter of its cost, or the covering of the turnpike road with rails, at, perhaps, one-twentieth portion of the expense of this joint-stock line.

Of the Birmingham and London, and the Great Western railroads, it is only required to remark that the expenses which have been incurred in the passing of the bills, and other preliminary arrangements for their construction, amount to a sum which would cover the whole length of the turnpike roads to those places, with two tracks of rails.

There are of other schemes which propose themselves for acts of incorporation in the ensuing session of parliament, altogether, a number

whose aggregate capital stock would amount to about fifty millions of money, of which great portion of the wealth of the country it is probable that were all the petitioning companies incorporated, about forty millions would be lost.

CHAPTER IV.

Steam locomotive power considered with reference to its expense—Shewn to be too expensive for use in conveying merchandise—The cause of its expense, and comparative cost of locomotive and stationary steam-engine—Cheapness of horse power, and its speed sufficiently great for the transit of goods—Horse power discussed in a statistical point of view.

HAVING thus obtained some views of the legislative economy of railways, it is proposed to examine next the material economy of the new system—and first, the propelling power.

The great disadvantage now experienced by the railroad companies is the difficulty of reconciling economy with speed, through the enormous outlay for the cost and repairs of the steam locomotive engines, the returns; of the Liverpool and Manchester company being found to exhibit the sum of 80,000*l.* per annum as required for the steam power, without including the damage and derangement of the road, through the pressure of those moving mountains of iron, water, and coals, of which the steam-drags and their appurtenances are composed. This great annual outlay for steam power is required almost for the conveyance of passengers alone; for the cost of transport by steam is so very expensive that little merchandise

is carried upon the railroad; and excepting for the rapid transport of passengers, the work may be said to be of no benefit to trade.

The Manchester and Liverpool railroad company have persevered in the use of locomotive engines up to the present time, although by that mode of conveyance the goods which, by horse power, are carried upon the Stockton and Darlington and other railroads, at one penny per ton, per mile, are not carried at less than 8*s.* per ton from Liverpool and Manchester, a distance of thirty-two miles: the consequent charge being about 3*d.* per ton, per mile, or two hundred per cent. higher than the usual charge where the horse has been substituted for the power of steam. In consequence of this charge for the conveyance of goods, the Liverpool and Manchester company have not succeeded in abstracting any very considerable portion of the trade from the canal, since out of nearly two millions of tons of goods which regularly pass between those two great commercial towns, the railway company has yet obtained only about 200,000 tons, or one tenth part of the whole; although the canal is about sixty miles long, and the goods three days upon the way. Indeed, it is asserted, that at this great charge of 8*s.* per ton from Manchester to Liverpool no profit arises to the company upon the conveyance of goods, but that a positive loss is sustained, and this loss is made up from their profits upon the conveyance

of passengers alone. Since, therefore, the charge for the conveyance of goods cannot be reduced without loss, below 3*d.* per ton, per mile, for steam power; and that charge is so much higher than the rate at which goods can be conveyed upon canals, it follows that if the utmost advantage be intended to be taken of the capabilities of the system, some cheaper power must be found.

Stationary engines have been fully proved to have no advantage over locomotive engines, by reason of the great loss of power in the distance from the load and other disadvantages; and, though a steam engine, when stationary, is certainly acting advantageously in not being burthened with the propulsion of its own weight, and of water, fuel, and attendants—yet the above counteracting circumstance has been found equally fatal to its profitable use.

Air engines, of various kinds, though promising to be a light and highly suitable contrivance, have not yet been brought into a perfect or practicable shape—and therefore the horse alone remains to be considered as the agent again to be employed.

First, to meet the objection,—that the slow motion of the horse, when drawing loads of merchandise upon a railroad, which does not admit the passing of faster travelling vehicles as upon a turnpike road,—it has already been proposed to remove the locomotive engines to a peculiar department of the work, either upon arches above,

or upon the ground in the centre of the road. By these means the necessity of conveying goods at a rate of twenty-five miles an hour, as upon the Manchester and Liverpool railroad, in order that passengers and mails shall not be obstructed in the rapid motion which is required, will be effectually removed; and the removal of this impediment will be next seen to convert the carrying of merchandise into an extensive source of profit, though now it is attended with a positive loss.

Having therefore removed the passengers, mails, and light articles of merchandise to the suspension road,—the next step is to organize the system of horse transport upon the track below.

It has been seen that upon the Manchester and Liverpool line, the charge for the conveyance of goods by steam is not capable of being reduced below 8*s*. per ton, and that a loss is probably sustained even at that high charge,—whereas, by horses, the same merchandise could be conveyed at 1*s*. per ton from Manchester to Liverpool, or only an eighth part of the charge by steam locomotive power. Experiment has shewn that the daily performance of a horse upon a level railway is equal to twelve tons conveyed a distance of twenty miles at the rate of two miles an hour. But without referring to the extensive improvements in the construction of the works, and the consequent great increase of the propelling power of the horse, which are undoubtedly at hand, let

us content ourselves with supposing that the daily task of the horse shall be not more than twelve tons, to be conveyed for a distance of twenty miles. At this charge of 1*s.* per ton, one horse will earn a sum of 12*s.* per day, or, at the rate of six working days, the sum of 3*l.* 12*s.* per week. The expense of the support of each horse in feeding, stabling, and attendance, would not be more than about 12*s.* per week, or less than one-third of its earnings, when engaged in the business of conveying goods at the rate of 1*s.* per ton for a distance of thirty-two miles. There is, accordingly, a profit of two thirds of the earnings of the horse, which profit will amount to 6*d.* per ton from Manchester to Liverpool; and if two millions of tons were annually conveyed by horse power (the canal being then closed) the profit would amount to 50,000*l.* per annum: whereas, at the rate of even 8*s.* per ton for steam power, a positive loss has been seen to be sustained. To this is to be added the great saving in the annual expenditure for the repairs of the road, when locomotive engines, weighing each about ten tons, and pressing fully upon the rail, shall be superseded by horses, whose weight will rest altogether upon the centre of the road.

Nor would the diminution of speed in the conveyance of merchandise be attended with the slightest injury to trade. At the rate of three miles an hour merchandise may be transported

by horses from Manchester to Liverpool in a period of ten hours, or from Birmingham to London in a period of fifty-six hours, or at full speed upon the suspension railway, in two hours from Manchester to Liverpool, or nine hours from Birmingham to London, and at a cost very far indeed below that for conveyance by steam. Then the immediate delivery of goods is not at all times a very material consideration, for at present the goods which pass from Manchester to Liverpool at 8*s.* per ton very frequently remain for hours in the warehouses of the company, although that time might have been employed in a slower motion by horse power at one eighth part of the charge for transport by this most unnecessary steam. Thus, under this system, the speed of conveying passengers and mails would not be decreased if the steam power were employed upon the suspension railway above, whilst the rate of conveying the goods by horse power below would not be inconveniently slow, and seven eighths of the amount of carriage would be saved by the change. The dividend upon the capital invested in the railway would therefore be increased, when 50,000*l.* per annum would be the profit upon the labour of horses where now an extensive loss is sustained, and a reduction of 7*s.* per ton would take place upon the two millions of tons of goods which would be annually carried upon the Manchester and Liverpool line. This would amount to the sum of 700,000*l.* per

annum, by which amount the consumers of the goods would be benefited in the consequent reduction of the price.

Next let us examine the advantages and disadvantages of the use of horses in a statistical point of view.

It has been reckoned amongst the most valuable consequences of the introduction of railroads, that horses would become disused, and that more food would accordingly be in existence for the human mouth. The keep of one horse is equal to the support of a labouring family of four persons; and if the whole number of horses be estimated at only four millions, the cost of their support will be equal to that of one half of the population of the land. To remove this animal would therefore make room for human beings to a very considerable extent; and the capacity for maintaining a double number of human souls is certainly much to be desired in a statistical point of view. But if the removal of the horse can only be effected by the substitution of steam power, which is ten times more expensive, or requires ten times more money than would suffice for the purchase of the provender of the horse, whether from our own farmers, or from the farmers of foreign nations, it follows that it would become folly to substitute the dearer for the cheaper power. Unless all the lands of the old and the new world were so covered with population that no subsistence remained for the quadruped

part of the creation, there would be no necessity for the banishment of the horse In China, an empire which is overflowing with a starving population, and which is too far removed from other agricultural nations to receive foreign grain, unless at an expense which would enhance its price beyond the reach of the great mass of the people, quadrupeds are very properly prohibited to exist. But when in England our corn laws shut out the superabundance of the corn of Poland, Belgium, Germany, the American States, and other agricultural nations, it is apparent that a change of policy alone, through the abolition of the corn laws, is required for the removal of our anxiety for superseding the labour of the horse. If inanimate power would, in reality, be cheaper than that of this animal, it would certainly be the true economy to adopt it upon railroads; but if the amount of provision which is consumed by the makers and attendants upon steam locomotive engines, from the commencement of the extraction from the mine of the iron of which they are composed, to the time when they are moving upon the road would be ten times more in amount than that consumed by the horses which can effect the same amount of work, it follows that the disuse of horses becomes an extensive waste of the very resources of the land.

Horse power, in the present state of our knowledge of the principles of motion, is, therefore,

much cheaper than any of which we are possessed. But even upon returning to its use upon railroads, the numbers will be reduced to one twelfth of the number now required upon a turnpike road; and therefore eleven twelfths of the land now required for the growth of animal provender will be convertible into the cultivation of the food of a population, which, though rapidly increasing, is yet more rapidly supplied by science, with extended means of support.

CHAPTER V.

Further improvements proposed—The rails should be narrow, hard, and smooth—Facings of polished steel proposed—Railroads should be straight—Tunnels considered, and the levelling of the hills generally to be preferred—Excavation of hills lessened in expense by the sale of the materials—Cheap transport will favour the formation of levels—Many extensive results of the system anticipated—Agriculture extended and improved—Mountains levelled, and climate improved—Great influence of the system upon the future prospects of mankind.

Having thus obtained the utmost economy of the general construction and moving power, it is proposed to offer other considerations for the improvement of this new system of roads.

First, of the rails. Facility of draught depends upon the diminution of resistance, and the minimum of resistance is obtained by the utmost acquirement of a surface which is narrow, hard, and smooth. Therefore the rails should be diminished to the smallest extent of horizontal surface which would support a given load, and should also be faced with polished steel. This substance is much harder, smoother, more durable, and less liable to rust than the rails of common iron which are now in general use. The circumference of the wheels of the waggons should also be similarly

faced with steel, and by these means a resistance so slight might be obtained, as to be little greater than the mere resistance of the air. Substances for procuring anti-attrition, might also be used.

Railroads, at whatever expense, should be formed in straight lines. Circuits increase expense for land, rails, and motive power, and for the perpetual support and repair of such needlessly increased distance: they also deaden impetus, and, consequently, speed.

Tunnels, however, should seldom be the mode of procuring a direct line of road. The expense of their construction, lighting, ventilation and repair, outweighs in general the saving of the rough labour which would be required for cutting direct through a hill. An important diminution of the expense of cutting through hills may be also pointed out in the storing of the material, and its sale at a future time, when the cheap transport upon the railroad shall enable it to be carried at a small comparative expense. Almost any description of stone, metal, or earth, will probably now become an article of sale. For the opening of railroads will give rise to the extensive formation of artificial soils in places along the lines, which will be raised in value by their contiguity to the work; and whether hills be found to consist of clay for brick-making, limestone for manure, or of coals, or ores of any kinds or even of stone or sand, all these will now become saleable materials.

During the progress of the excavations the material should be hoisted upon cranes, and deposited in the vicinity until the opening of the railroad shall enable it to be sold. It is probable that the sale of the material would frequently be more than equal to the expense of quarrying through a hill; and it is certain that in some situations immense profits would be found from that source. Tunnels, therefore, unless the mountains be of an unusual height, will probably become disused.

Railroads should be wide. Increased width of the track would bring the horse, or locomotive steam engine, nearer to the load, and thence would extensively increase the power. Single horses and waggons are the most effectual means of obtaining the utmost power of propulsion, because the load is then brought nearer to the centre of effort, whereas, by teams, the diffusion of the force occasions it to be proportionally lost. This principle is most strangely neglected by the farmers of England, in the use of the horse in the waggons and ploughs of the southern districts of the country, for more coals or corn can be carried in two one horse carts than in one waggon drawn by four horses in a row. Two horses abreast, and one man, in Scotland, plough more land and in a better manner in the same given time,* than four

* Read Arthur Young on this subject.

horses and two men in the counties of Middlesex or Kent. Thence one half of the horses of England and one half of the labour of the attendants upon them, and one half of the capital invested in the horses, harness, stabling, and repairs, all in reality are lost. This has an extensive influence in producing what is termed agricultural distress; but which is probably little more than another name for agricultural stupidity and waste.

Upon the above principle railroads should be increased to any width which will allow the saving of power to be superior to the value of the land. In the tracks to be devoted to steam locomotive engines, this will be of more importance than upon those whereon horses are intended to be used, because steam power being so much more expensive, is consequently required to be more economically used. Therefore the central track, which in PLATE III., page 17, is seen to be devoted to steam power, is more than double the width of the side tracks, upon which horses alone are to be used. Upon the Liverpool and Manchester railroad the waste of steam-power is very considerable in this respect, for the line of carriages, with the intervening space occupied by the tender to the engine, reaching frequently to a very extended distance from the power. The widening of the tracks for steam locomotive engines is, therefore, of much importance; and, further, this increase of width would allow the carriages to be constructed in a more

comfortable form, even with the conveniences of houses flying through the air.

The tracks of the principal lines of railways should be of an exact uniform width throughout England, Scotland and Ireland, and even through France and the neighbouring continental states. This will save the cost of unloading and reloading the waggons, which then may travel without impediment throughout the whole length of the kingdom; and the same waggons may be shipped with their loads, at the seaports; and in the same state unshipped, and placed upon the railways to pass through Ireland, Scotland, France, or the neighbouring continental states. To economise space and diminish weight in the sea-transport of waggons, the material of their construction should be studied to combine the utmost weight and strength; the wheels being taken off at the port of their shipment, and wheels of the same dimensions being supplied at the port of discharge.

The tracks upon which private carriages and common carts, and other vehicles are to be conveyed, should also be light. Then each farmer arriving at the railway will place his cart upon the track—and, using his own horse, or hiring his power from the commissioners of the railroad, will carry twenty times more hay, corn, or potatoes to market, and will return with twenty times more provisions, coals, or lime, than can be drawn by the same horse upon the present turnpike road.

Then the wear and tear of an iron road being not one quarter of that of a road made of stones, the toll will be reduced to about one quarter of the present rate,—the full result being, that the expenses of transport will be reduced to one nineteenth, and that of tolls to one quarter, of the present average expense. But this is limiting the saving to that which has been ascertained at the present time: but allowing that great improvements in the formation of levels and rails to be at hand, and the minimum of resistance to be obtained,—it is not improbable that one horse shall ultimately draw, not twenty, but fifty, or one, two, or more hundreds of tons. The resistance of the surface of the rail being reduced to the smallest extent, and the impetus of the load counterbalancing the resistance of the air, the propelling power of the horse would seem to be almost without bounds. Perhaps even horse power may become disused, and waggons be ultimately propelled by cranks and the human hand.

In national economy these changes will produce the most important results: for each farm-house communicating with the main railroad, by another small railroad down the lane which forms the present communication with the turnpike road, the whole object of horses in the business of transport will be entirely at an end. And as the carriage of corn, coals, lime, manure, building

materials, and other heavy commodities, form one half of the labour of the horses upon a farm, their support will be attended with a double expense when required only for the plough; and though at the present prices of human and of horse labour, the spade, through its increased productiveness, employment of manual labour, and consequent saving of poor-rates, is already considerably cheaper than the plough,—yet, when the cost of animal labour shall be comparatively doubled, it is certain that human hands alone will be employed in agriculture, and that this will occasion the universal introduction of garden cultivation, and the entire disappearance of the horse. Thence double the number of men will be employed; and yet there will be more than three times the present amount of food for their support. Thence manufactures will be extended, through the existence of this surplus of food, and almost boundless fields will be found for expanding population, revenue, and wealth.

But further results present themselves. The cheap carriage of manure, lime, clay, sand, marl, and other substances will occasion an extensive manufacture of new soils. The science of chemical agriculture will become of the most extensive benefit to nations; for the carriage of the materials no longer interposing the difficulty of expense, the land may be rendered of equal fer-

tility all over the world. The soils now useless to man, will be cured of their sterility, when the requisite material for combination can be purchased at a distance, and conveyed at a cost of probably one farthing per ten tons, per mile. Then the mountains will be levelled for the value of the soil, stones, ores, or other materials of which they are composed, and for the acquisition of the land now covered with their bases, which will then be covered with a cultivable soil. Improvement of climate will then rapidly follow the removal of elevated ranges from the high latitudes, and the air of these islands will be rendered more genial, warm, and dry. The bogs, locks, and estuaries, will be drained and converted into land, by the diminished expense of such undertakings through tramways and railroads, and the surface of the British islands be even doubled in extent, and all capable of being brought into a state of garden cultivation; whilst the fisheries will be extended, and millions of people be employed in drawing a now neglected abundance from the sea. Then these changes will be carried to all surrounding nations—the interests of countries will become embedded so firmly that war will be rendered impossible, and the ancient balance of military power will become thought of no more. The public health, intellect, and manners will be improved by this rapid intercom-

munication of the people, liberty and science will become universally diffused,—and the mind becomes, indeed, lost in the attempt to follow after the immeasurable results which this annihilation of time and space will produce upon the future destinies of mankind.

CHAPTER VI.

Railways and canals compared—The superior advantages of railroads when economically managed—The present advantages of canals owing to the misuse of steam-power upon railways—Canals inferior to railways in economy and speed—Render great tracks of country damp—Have a humid influence upon climate—In every respect a rude mode of conveyance—Their disappearance a great advantage in a national point of view.

The next division of the system which it is proposed to examine, is, the relative advantages and disadvantages of railways and canals.

The threatened destruction of much valuable property in canals, has induced many of the proprietors of those works to entertain a desire, that through their economy in charge, the disadvantages of slowness may be outweighed, and the contest with railways be maintained. It is said, by these persons, that though the new railroads may appear to be certainly more magnificent and eagle-winged than the ancient and more unpretending mode of conveyance by canal; yet that experience has shewn, and will continue still further to establish, that the dearness of the construction and repairs of the railroads will be found to raise the cost of transit to

a rate which will much more than counterbalance the advantages in the saving of time, and that this consideration will at length prove fatal to their use. The fact is alluded to, of the confident predictions of the Manchester and Liverpool Railway Company, that the canal should be annihilated forthwith, and that rushes and weeds should cover the bottom of it in a single year,—yet, notwithstanding that experience has shewn that the canal has not only maintained the contest with the railway, but may now very safely set at defiance all future railway opposition. The railway, though only one-half the length of the canal, yet is so expensive a work in its construction and repair, that goods cannot be carried upon it at a less price than upon a canal which is sixty miles long, and therefore contending with it under the disadvantage of a line of twofold cost for construction, repair, motive power, and all other sources of expense. If, they say, the canal from Liverpool to Manchester were only thirty miles long, and therefore its expenses one-half of the present amount,—it would be totally impossible for the railway, which now does not take away one-tenth portion of the trade, to continue in existence when the charge per ton were reduced one-half by the canal. How, they say, could a railway, which already derives no profit, if not a loss, from the carrying of goods at 8*s*. per ton, continue to rival a canal, which, if constructed of equal length

and at an equal expense, would then be enabled to reduce the rate of carriage to one-half of the present rate?

To all this, however, the reply may very confidently be made,—that the amount of experience, from the effects of the Liverpool and Manchester railroad, is totally insufficient for proof of the superior cheapness of canals. We have seen, already, that the horse system has never yet been attempted upon that railroad; and it is the vast and wasteful expense for steam locomotive power that has occasioned the nonfulfilment of the threats to close the canal. By the previous calculations entered into with reference to the comparative expense of steam and of horse power, we have seen that the one is seven times more expensive than the other,—the goods which are now conveyed for 8*s.* per ton from Liverpool to Manchester by steam locomotive engines, being capable of being carried at 1*s.* per ton by horses, a profit of one half of even that low rate of tonnage remaining to the company. Now, if the proprietors of the canals, at the present time, charge 8*s.* per ton for carrying goods from Manchester to Liverpool, and the same kind of motive power were resorted to by the railway company, the former would forthwith be compelled to reduce their rates of carriage to one eighth of the present price. This they could not, by any means whatever, afford; for a canal, —with its extensive excavations, locks, reser-

voirs, and the other great works attached to its first construction, with the great cost for clearing out, and annual loss from stoppages by drought in summer, and the ice in winter,—in all these things considered, is an infinitely dearer work in its construction and repair, than any judiciously constructed railroad possibly could be. For, if horse power be used upon railroads, it has been shewn, from the example of the collieries, where they have been in use for so many years, that the expense of their repair is almost too trifling to be named. A canal, however, is subject to very extensive expenses, for repairs of locks, banks, and reservoirs, motive power, attendance, and numberless other charges,—and, therefore, canals would not be enabled to compete with the railway, if the expense of the motive power were the same.

Perhaps a fair mode of viewing the comparison between railroads and canals, is to suppose that steam locomotive engines should be used for drawing the barges and packet-boats which now pass along the canals. If this power were introduced, the expense of engines, with their wear and tear, and the wear and tear of the banks of the canal, would be found so great that passengers and goods could not be conveyed upon them at the rate of twenty-five miles an hour, under an infinitely higher rate than is now charged by the iron road.

That canals will be totally unable to compete with horse power upon railroads, will be abundantly shewn from the present charge upon the Birmingham and London canal, which is usually 3*l.* per ton for the carriage of goods from the metropolis to Birmingham. This charge amounts to no less than 6*d.* per ton per mile, estimating the length of the canal to be about one hundred and twenty miles; and though it may be true that the rates of tonnage could be very considerably lowered in the event of rivalry from railroad companies, yet it is not to be supposed that the reduction could extend to one sixth of the present rate, or one halfpenny per ton per mile,—which, by the estimate of the result of horse-power on the Liverpool and Manchester railway, is the rate at which goods can be conveyed, even without further improvements in their construction, as seen at the present time.

It has, however, been asserted, that the new mode of using the power of the horse upon canals, will come in very seasonably to revive the hopes of the proprietors of canals. This is the introduction of the system of conveying boats upon canals at the utmost speed of the horse. This, upon some of the canals in Scotland, has been found to be a most valuable discovery in canal navigation, and one which, unfortunately, has come only a century too late. From the experiments upon the Ardrossan canal, it is proved,

in the words of Mr. Graham, that "two horses on the Paisley canal draw with ease a passage-boat, with a complement of seventy-five or ninety passengers, at the rate of ten miles an hour,—whilst it would take even double that number of horses to draw the same load along the canal at the rate of six miles an hour; and it would be decidedly easier to draw the load at the velocity of fifteen miles an hour than of six miles. The ordinary speed for the conveyance of passengers along the Ardrossan canal has, for several years, been from nine to ten miles an hour." Now the introduction of this practice of travelling at the higher rate of speed, is supposed by Mr. Graham to be an important means of enabling canals to compete with the railroads through the amendment of the speed to a rate equal to the reasonable wishes of the public,—and that too being accompanied by so extensive a saving of horse power as materially to lessen the expense of transport upon canals. It seems, moreover, that this increased speed has not raised so great a commotion in the water of the canal—nor have its banks been more worn than though the slower rate of passing along its banks; the boat gliding over the water, and raising up a less volume of resistance at the stem. But all these advantages are derived very obviously from the common principle of increased impetus with increased weight and speed. The boat upon the

canal is propelled with more ease at the rate of ten than of six miles, because the impetus and power of self-propulsion become greater at one rate of motion than another; and though this is undoubtedly a great advantage in canal-navigation, it is apparent that the same principle will act equally in favour of the railroad,—increase of speed increasing the expedition of the horse as much upon a railroad as upon a canal; and as the principle will be taken advantage of upon railroads, all its comparative advantage towards the proprietors of canals will be thenceforth lost.

Moreover, this rapidity of motion can only be obtained upon the small number of canals which pass through level districts of country, and are therefore without locks. Where these obstructions occur, the delay would not only form a great deduction from the advantages of the former speed, but the impetus would be lost, and be required to be regained upon passing each of the locks. Upon railways, however, there cannot exist any such impediments to the impetus and speed; for if the lower road be not a perfect level, the suspension works, by lengthening the pillars, may be constructed upon a perfect plain, and thence the utmost advantage of the impetus may be obtained upon a railroad, though it is subject to be perpetually impeded and lost upon a canal.

But though the contest is certainly hopeless

against well-constructed lines of iron road, sites of canals cannot be without their value, since the alluvial deposits upon their bottoms would appear to render them the most fertile of land; or some of these lines of canals may pass with sufficient directness from town to town to admit of their being constructed into railroads; and as the chief expense of railroads will probably be in future in the purchase of the land, it will be a paramount advantage that canal companies will have in their possession the ready-levelled land. In some situations, the sites may perhaps be converted into aqueducts from town to town; and many other modes of applying the property will undoubtedly arise.

In some of the individual proprietorships, the loss of the property is less to be regretted, from the remembrance of the enormous wealth which has been derived from the canals; as those of the Duke of Bridgewater, upon which the charges for transport have been usually lower than the expense of carriage upon the turnpike road only by the smallest amount which would draw the trade to the canals for the benefit of the proprietors, and without any reference whatever to the general benefit of trade. Though Acts of Parliament were granted for the whole of the canals of the Duke of Bridgewater, yet the tolls have always been most enormous in amount, and the general benefit to the commerce of the coun-

try has been infinitely less than has been usually supposed.

With reference to their influence upon climate also, the disappearance of canals is much to be desired. In these islands they add undoubtedly in a very extensive degree to the humidity of a country already humid to excess; for not only are the surfaces of canals and their reservoirs exposed to the influence of evaporation, but the adjoining lands are also in many situations rendered marshy and unwholesome to a very considerable extent.

It is, therefore, apparent, that canals are now to be classed amongst the rude inventions of a former age; and that there is not the smallest probability of their continuance in existence in opposition to the more modern invention of iron roads.

CHAPTER VII.

Proposal for one great line from Dover to Glasgow—Through the centre of the manufacturing districts of the kingdom—First division of the work from Dover to London—The navigation of the Thames superseded—Consequences to dock property not disadvantageous—The trade of London will be increased by railway transit—Calculations of the general saving by the supercession in the Thames—The line from Dover to be carried to the Thames Tunnel—Proceeds due north to Birmingham, Manchester, Glasgow, and Carlisle.

Having thus discussed the principles of the economy of the legislation, construction, and moving power of railroads, I propose to pass next to the more immediate results of the system, as seen in the formation of lines of road through the centre and to the Eastern and Western portions of the kingdom, for the purpose of connecting all our seas.

The first great line is proposed to be constructed from Dover to London, and thence without interruption to Birmingham, Manchester, and Carlisle, and through Scotland to Glasgow; thus passing through the whole of the great manufacturing districts of the kingdom, and measuring a distance of four hundred and forty miles. This line

will comprehend so wide a stream of trade, and will be the grand artery from which so many smaller branches will be carried to the east and to the west, that its construction may be undertaken upon a very extensive scale.

Let us, then, take our departure from Dover to London, between which places the distance, in the nearest line, will be little more than about sixty miles. Now, supposing a vessel to discharge its cargo at Dover, and the goods to be conveyed at the rate of 1*d.* per ton, per mile, upon the railroad to London, the whole amount of the expense of conveyance for this distance of sixty miles will be 5*s.* per ton; the time occupied in the passage being not more than about seventeen hours. On the other hand, the present expense of sailing from Dover to London, including pilotage, light-money, dock dues, and the other countless charges of the Thames, cannot be estimated at less than 25*s.* per ton; the passage also occupying more than an average of five days, through the expensive, intricate, and dangerous navigation of the Downs and the Thames. Thus, in addition to a saving of about 20*s.* per ton in the carriage of goods will be the saving of the interest upon the value of the cargo and the ship for a period of four days, with the saving of insurance, wages, victualling, and the whole of the expenses of the vessel for the same period of time. It is, therefore, quite apparent, that upon the opening of a railway from the

English Channel to the metropolis, the expense of navigation will be so much greater than that of transportion by land, that the whole trade of the metropolis will be withdrawn to a port or ports upon the southern coast; unless, indeed, the barbarous system of impeding the progress of improvement be resorted to by the goverment, for the purpose of preserving the property in docks, warehouses, and other commercial appurtenances of the Thames.

But let us examine this matter, in anticipation of the closing of the docks.

First,—though the East and West India and London Docks were abandoned by the shipping, still the sites of them would not be lost. These docks cover an area of miles; and were the water let off, the soil would be found to be of the richest alluvial kind, in consequence of the deposits which are perpetually accumulating in all such spots. If the water of the Thames were built out by a wall at the present entrance to the docks, and the surface were covered with mould, turf, or other vegetable matter, then so much ground for gardens would succeed to the present body of water contained in the docks. Considering that these docks are already too numerous, that the dividends upon the stock of the West India and London Docks do not average more than about two and a half per cent. per annum,—that millions of capital have

been lost through the decline of the value of the shares, and that the loss of undue monopolies is now causing London to decline rapidly to its natural dimensions—it is to be doubted whether these properties would not already be made more profitable by employing the sites in laying out gardens with ranges of dwelling-houses above, or in converting the ground into manufactories, warehouses, vaults, and the numberless other valuable modes for the employment of land in the heart of the metropolis of the world. Then the whole of the outbuildings can be converted into manufactories, warehouses, and dwelling-houses; since the carriage of coal, iron ore, cotton, and other raw materials will be reduced to so low a rate upon the railroads as to allow manufactories to be established in all situations where there is a population to manufacture and consume the products; and therefore the average trade of the metropolis will be probably increased by the abandonment of the navigation of the Thames. When coal shall be conveyed from Staffordshire to London at a charge of 5*s.* per ton, and iron ore at the same low charge, the metropolis, from its dense population, and greater vicinity to the sea, will have some advantage over the more inland districts, in the diminished distance of the carriage for exportation of the finished articles of cutlery, cotton, silk, and other departments of manufacturing industry which undoubtedly would arise. The ge-

neral trade of the metropolis being then not likely to decrease, but very greatly to increase, by the cheap rates of conveyance upon the railroad from Dover to the metropolis, it becomes less required that the economist should be anxious about the destruction of the property in the docks, warehouses, and other mercantile property upon the banks of the Thames. Moreover, the property for miles along the banks of the river consists of streets so ancient, filthy, and of value so small, that the formation of the modern ranges of buildings which would arise upon their ruins, would become an ultimate source of extensive gain.

Having brought the railway from Dover to London, let us pause to examine the effects which this direct land communication from the metropolis to the English channel will have upon the general commerce of the nation.

It has been shewn already, that the charge for conveying one ton of merchandise from Dover to London will amount to not more than 5*s.* per ton, at 1*d.* per ton, per mile. Now the number of vessels of all descriptions which enter the Thames may be averaged at about twenty thousand in each year; and, at an average burden of two hundred tons each, it would appear that the total amount of goods carried upon the Thames may be estimated at about two millions of tons per year. If, therefore, this immense quantity of merchandise can be carried in one day, and at a charge of 20*s.*

per ton less upon a railway than upon the Thames, a direct saving of 2,000,000*l.* per annum will result to the general trade of the metropolis from the carriage of merchandise alone. If it be added to this that passengers will be conveyed at a quarter of the present charge to Dover, and that that port will become the great outlet from England to the continental states, and to all quarters of the world,—and therefore the number of passengers will be many millions in the year,—it is no exaggeration to suppose that a well-constructed railroad from the metropolis to Dover would produce a saving in the expense of transporting passengers, merchandise and mails, of upwards of five millions a year.

All this time the commerce and manufactures of London would have a tendency to increase, whilst the docks, warehouses, and other mercantile property of the Thames would not be ultimately reduced in value by the change.

Some other advantages would be obtained, as that the Thames, when no longer disturbed by the annual passing and repassing of about twenty thousand steam-boats and ships, would resume its natural beauty of appearance, the fisheries would be re-established, and the water of the metropolis become more pure.

The towns of Greenwich, Gravesend, and other places upon its banks would be visited by means of railways, and therefore would experience

no loss through the trade being diverted from the Thames.

Railways being carried from the Thames Tunnel to all parts of the metropolis upon both sides of the river,—there is every reason to suppose that very great advantages would ultimately arise to all the districts now depending upon the Thames.

But though all these advantages should not be realized, and the docks, wharfs, warehouses, and other property upon the river be depreciated in value, there is at least ample room for the payment of some compensation, and even for the purchase of the whole of the property, out of the profits of a road, which will realize a profit of five millions a year, by cutting off the expensive, circuitous, and dangerous navigation of the Downs and the Thames. The general interest of the inhabitants of London is not concerned in the preservation of the navigation of the Thames; and as other districts and towns will have the advantages of railways, it would be placing the metropolis in a position of decline, to refuse to adopt a system which otherwise will cause the present commerce of the Thames to be extensively withdrawn to Liverpool, Bristol, and other ports to which the expense of transit will be less. For if no railway be carried from London to the English channel, yet a railway, of one hundred and twenty miles from Bristol to the metropolis, would enable a ton of goods to be conveyed at consider-

ably less cost than by the navigation of the Thames. As the trade would even be withdrawn by a railway of a length of one hundred and twenty miles, it would be folly not to proceed to the extremity of the advantages of the system, by passing direct to the sea, by a road only of one half of the length of that which could not be prevented from being executed, and which would equally cause all the losses apprehended through the abandonment of the Thames. Indeed, navigable rivers, canals, and all other modes of conveyance by water, will now be utterly laid void. For, not the Thames alone, but the Shannon, the Mississippi, the St. Lawrence, and all the other great navigable streams will now be deserted for the land. Let father Thames then die.

Thus we have brought the railroad from Dover to London, at the Thames Tunnel, a work, which the inspection of a map of the metropolis will show to be most fortunately situated for carrying the line forward to the North. This line would not only be the most direct that could be constructed from Dover to Birmingham, but it is at the same time the cheapest route that can be found. The expense of purchasing metropolitan property is so great in any situation upon the Thames, and the line from Dover to Birmingham through the Thames Tunnel is seen to touch so much less of that property than any other point through which the railroad could be carried, that the very

expense of passing the metropolis will be extensively diminished by carrying the great line to that most economical, central, and direct of all the passes of the Thames. The dimensions of the Tunnel are sufficient for the passage of waggons upon two tracks of moderate width, being eighteen feet in height, and thirty-four feet wide. But should the completion of the Tunnel itself not be found practicable, or its use for a railroad-track be not, for any other reason desirable,—it is at least apparent, that the same spot is the most desirable one for the erection of a steam ferry for the passage of the Thames.

Thus, then, we have passed from Dover to London at the Thames Tunnel, and thence to Watford, and upon the present track of the railway, or upon the turnpike road through the intervening counties to the iron districts of Birmingham, and thence to the potteries of Staffordshire, the distance from Dover being an average of about one hundred and eighty miles. Therefore, at a charge of 1*d.* per ton, per mile, the cost of conveying goods from Dover to Birmingham will be about 15*s.* 6*d.* per ton, the distance being accomplished by horses in about forty-eight hours, whilst at present the charge for the conveyance of goods by canal from Birmingham to the metropolis is usually about 3*l.* per ton, and the porterage to the warehouse of the merchant, and thence to the dock, with the loss

of time upon the repeated unloadings of the goods, cannot be estimated at less than an additional 1*l.* per ton. The expense of the commission agent and of the porterage to the ship will certainly not be saved, because these two branches of expenditure must be undergone at Dover itself, and so also must the harbour charges, though those will be comparatively slight, since the waggon may pass from Birmingham to Dover, and for the first time be unloaded upon the railway terminating at the dock. Estimating, then, the real saving by the railway from Birmingham to Dover to be only 2*l.* per ton, as contrasted with the present charge by the canal and the Thames, yet immense will be the saving of capital from a reduction of 2*l.* per ton upon all the iron and earthenware exported from the iron districts of Birmingham, and the potteries of Staffordshire, with a corresponding economy in the transit of the colonial and other imported commodities required for those hundreds of thousands of souls engaged in that great scene of industry and skill.

From Birmingham the line will proceed onwards to Manchester, from which great manufacturing town to Dover will be a distance of two hundred and forty miles, and the charge of conveyance to the sea, at 1*d.* per ton, per mile, will amount to 20*s.* per ton. Whether, therefore, the export and import trade of Manchester and its surrounding towns will centre upon this line, or

be divided by the Manchester and Liverpool railway on the west, and a railway through Yorkshire to Hull upon the east, may perhaps remain to be determined; but the cotton, silk, woollen, and other manufactures consumed by the millions of the population of Birmingham, London, and all other southern districts of England, with the whole of the exports from Lancashire to the European states, will certainly be conveyed upon the line.

From Manchester, the work is to be carried northward to Carlisle; and at that city a railroad to the eastward already is in existence to Newcastle and the German Ocean, at Shields,—by which line the coals, lead, and other mineral productions of Northumberland, and the general imports from the Baltic to Newcastle, will be conveyed across the island to the Irish Channel, to Liverpool, Glasgow, and all our western shores.

From Carlisle the work then branches westward to Portpatrick, in Scotland, a distance of ninety miles. This port is the nearest to Ireland of any in this division of the kingdom; and therefore the branch proposed from Carlisle is to be the principle line for the Irish trade.

From Carlisle, the main line then proceeds north, through the manufacturing districts of Scotland, to the city of Glasgow, a further distance of ninety miles,—thus forming one complete chain of road from Dover to Glasgow, in a distance of four

hundred and fifty miles; and in a similar distance from Dover to Portpatrick, on the western branch; and to Newcastle, on the east; the line thus passing through the heart of the manufacturing districts of the kingdom, and being of uniform width and general arrangement, enabling a waggon to pass, without being unloaded, from the English channel to the eastern and the western seas.

Here it is to be observed, that the calculations of the rate of transport are founded upon the general rate of 1*d.* per ton, per mile; not because that rate is the minimum of toll,—for it has already appeared that the rate may be reduced to one tenth, or perhaps even a much smaller toll; but as this work is intended less for the examination of the minuter details than for the exposition of the general principles, and the broad outlines of a system which is yet only in the dawn,—it is preferred to take that which already has been established as an abundant toll.

CHAPTER VIII.

The works now in progress at the harbour of Dover considered—Its improvement shewn to be difficult from natural causes—Proposed new harbour upon that part of the English Channel—Mode of constructing it—Its expense repaid by the shipping drawn from the Thames—Proposed land communication with France—Shallowness of the sea, and facility of constructing a pass—Several modes proposed, a bridge, causeway, tunnel, steam ferry, or floating bridge—Great revenue and international consequences to arise from the pass.

Thus, then, we have traced out a great line from north to south, and from east to west; and now it will be necessary to return to the starting-place at Dover, to examine into the possibility of providing a harbour of sufficient capacity for all this great stream of trade.

For the harbour of Dover, in its present condition, has not convenience, extent, or depth, for the purpose of containing the whole of the shipping which it is supposed will be withdrawn from the Thames. It is, indeed, what is termed a dry harbour, having only a few feet of water, and perpetually changing in its depth,—the beach, with which it is habitually liable to be choked, through its exposure to the south-west wind of the English Channel, causing an enormous and repeated expenditure of the public money to keep clear this harbour for the pur-

pose of the packet-service between England and France. Some hundreds of thousands of pounds of the national money have been, at sundry times, expended in the works necessary for the scouring of the harbour, as the process is termed by the engineers,—and yet the entrance remains to this time more obstructed by the beach than at any former time. This process of scouring is effected by the erection of flood-gates, within which the water is enclosed when the tide is full, and let off when the harbour is dry, for the purpose of sweeping away by its impetus the beach which is collected at the mouth. This operation has, however, been always found to give a very temporary relief, for the beach, which has been thus expelled by the water from the flood-gates, has been usually thrown back to its old position upon the first gale, from the south-west or south. Thence all former attempts having failed to keep away the beach; and the port, as the nearest to France, being obliged to be kept open, at whatever expense,—and the accumulations of beach being now so great as to threaten the entire annihilation of the port,—the scouring system has again been commenced during the recent year. The works now in course of construction are upon the former plan, but greatly increased in their dimensions; the arches and flood-gates now being upon a scale which will pour out a much greater volume of water, than the

similar works which formerly were found to be insufficient in their force for the purpose of keeping the harbour clear. From appearances, some hundreds of thousands of the public money is about to be expended in the attempt; and this enormous sum, in addition to the many other hundreds of thousands which have been already expended in similar operations at this port, will be totally wasted, should the experiment not succeed in finally clearing away the beach. For it appears that the quantities of beach thrown up by the south-west wind exceeds almost all belief, beds of it of many feet in depth, and many thousands of tons in weight being said to be sometimes thrown up in the course of a single night; and thence it is considerably to be doubted whether any opposing force sent out from flood-gates will have any permanent effect in carrying away the beach.

For it is to be observed that the natural cause of this accumulation of beach in our southern harbours is the increasing prevalence of the west and south-west winds, and, whether owing to the clearing of the forests of America, or to other natural causes, it is certain that the west is now assuming almost the permanence and regularity of a trade-wind.

It is this increasing prevalence of the westerly wind which has caused the rapid inroads which the sea has been making in recent years upon

all our shores; for the weight of the Atlantic Ocean is thus thrown with a perpetually increasing impetus upon these islands, whilst the Gulf Stream is also forced annually further to the eastward; and the melting of the icebergs, which descend from the Polar seas, and are arrested in the stream at the southern edge of the Banks of Newfoundland, also tends to throw the Atlantic Ocean with an annually increasing force against these shores.

Indeed, the chalky cliffs of the southern coast oppose so little resistance to the inroads of the sea,—falling annually in bodies of acres in extent along the whole coasts of the English Channel,—that it becomes a conjecture whether in the course of a few ages the whole of these islands will not be swallowed up by the waves, if walls or other artificial means of defence be not opposed to the advances of the sea.

It is, then, the falling of the cliffs which occasions the accumulations of beach in the harbour of Dover, and against which no system of scouring will, in any probability, have the smallest permanent effect.

For these reasons, then, it is proposed to commence operations at the harbour of Dover upon a much more extensive scale: by constructing indeed a new port, by building into the sea to the deep water, which is at a distance of about three miles, where a clear bottom, with five fathoms of

water, may at all times be obtained. For this purpose it is proposed to take down the cliffs, and, by the agency of rough labour alone, to fill up the sea for an area of several miles. The material of the cliffs presents itself in mountains, and is of a texture neither too hard nor too soft for the purpose of a well-consolidated work; whilst the labour of convicts, with tramways, and other modern machinery for facilitating such undertakings, would render the covering of a few miles of sea an object of no very considerable expense. By building upon the present beds of beach, the harbour would be freed from the possibility of all future accumulation, since the bed of the channel is there worn clear by the operation of driving the beach forward upon the land; and as no more material would afterwards fall from the cliffs, which would no longer be washed by the sea, a clear harbour, and the certainty of its remaining unobstructed, would thus be obtained by the accomplishment of the work which is proposed.

The spot at which to commence these operations is between Dover and Folkstone, the nearest point by about three miles to the coast of France. Here, then, I would cover the sea for an area of several miles with the material from the cliffs; and, having arrived at the deep water, thence would build walls of hewn stone or of rough material, with external surfaces of iron, forming in

the interior the docks and other appurtenances of a harbour of great extent. As it will not be doubted that a harbour may be formed in any situation where labour and money can be found, it remains only to be proved, that the revenue to be derived from this new port would superabundantly repay the expense of its formation.

Allowing that the rough labour of taking down the cliffs, and depositing the materials as proposed, would, by the employment of convicts, be comparatively slight; yet the hewn stone-work, and the building of the docks, warehouses, and other appurtenances of so great a port as that which is proposed for the supercession of the Thames, may be estimated at little less than five millions of money. But then to repay this great expenditure of capital we shall have the whole of the shipping which now navigates the Thames. These, from official returns, have been shewn to be about twenty thousand per annum, of all sizes and kinds, and may be estimated at an average burthen of two hundred tons. Then, without estimating the enormous increase of our foreign trade which the railway system, and the general increase of the wealth and population of the country are undoubtedly destined to bring forth,—let us take the whole number of shipping which may fairly be calculated upon as entering the future harbour of Dover at twenty thousand, of an average burden of two hun-

dred tons, and the consequent whole annual tonnage paying to the port is thus shewn to be about four millions of tons. This amount of tonnage, at a charge of only 2*s.* 6*d.*, per ton, (which is not a quarter of the present charges of the London Docks,) would realize the sum of 500,000*l.* per annum, or an annual dividend of five per cent. upon 10,000,000*l.* should so immense a sum be required for the completion of the work. That so great an expenditure would be required in these days when labour abounds, and when machinery has even been invented for hewing stones at one-quarter of the former expense,—cannot for a moment be supposed. And as the present harbour of Dover cannot be permanently kept open by the scouring system; and the money which is now in the act of being expended will, in every probability, be virtually thrown into the sea; and many more hundreds of thousands must be thrown after it, in a repetition of similar attempts; it becomes certainly worthy of consideration whether one grand harbour should not be carried into the sea, at a spot which is situated by nature for so happy a point of communication with the whole of these islands by railways and by navigation with the whole continent of Europe, —and, indeed with the whole of the modern world.

But, in these days we should not content ourselves with a mere harbour at Dover, but pro-

ceed to carry forward a land communication with the coast of France.

It has been shewn that the distance from the land to the southward of Dover to the opposite shore, is about three miles less than from Dover to Calais; or about eighteen miles at the nearest position between England to France. But the very works which have been proposed for the new harbour, will cover about three miles of the distance, and another mile would also be gained upon the wall which would thence project for the enclosure of the new port. We, therefore, at the extremity of this wall,—which would be built in the form, and with the width and strength of a breakwater,—shall stand within fourteen miles of the coast of France, and as a similar new harbour will be required at Cape Blacknez to the extremity of the opposite works will be only a distance of ten miles from land to land.

Here, then, I propose the continuation of the land communication, and of the railway passage, from England to France, by the construction of a chain-bridge, a causeway, a tunnel, a floating-bridge, a bridge of ships, or any other, the cheaper and most practicable mode.

The sea between England and France is extremely shallow, the Channel here carrying soundings—nine, ten, eleven, and nowhere more than about twenty-five fathoms, and the average

being about ten fathoms, or a sea sixty feet deep from England to France.

Now, there is nothing in water sixty feet deep to present any insuperable obstacle or even extraordinary difficulty in the formation of a bridge. The foundations of very many bridges over rivers have been laid by the diving-bell, and coffer-dams at a depth much greater than that of sixty feet, and there is no difference, of course, between operating in a river and in the sea.

Let us, then, examine the cost of constructing such a bridge, ten miles in length.

It is to be observed, that, by the railway from Birmingham to Dover, the iron-work required, could be conveyed, at an extremely small expense from the districts where it must of necessity be prepared ; and by the new invention of machinery, stones can be hewn at one-quarter of the former cost,—from which two causes the expense of this undertaking would be most considerably decreased. The buttresses must be, not only sixty feet under water, but sixty feet above the surface, for the purpose of a due elevation above the waves of the sea ; but these may be diminished in size to an extraordinary extent, by adopting the system for bridges and viaducts referred to in plate 2, page 17. Indeed, the diminution of the size of the buttresses will not only greatly diminish the expense of bridges for railways, but by the corre-

sponding diminution of the resisting surface, add greatly to their durability and strength.

This bridge, then, from the extremity of the works of the newly-proposed harbour, to the extremity of the similar works at the harbour of Blacknez, upon the coast of France, will measure in reality only about ten miles. Its construction being proposed to resemble the arched work of cast-iron or hewn stone described in a former portion of this work, the expense will be reduced to about one-twentieth portion of the cost of a solid cast-iron bridge of the usual form; for the arches being only of one or two feet in width, and the centre arch supporting a double sleeper and rail, and the intermediate work consisting only of wood, the real width of the iron-work will be only about six feet, for a bridge fifty, or more, feet wide; and the cost of ten miles of elliptic arches, of one hundred and twenty feet in span, at a moderate price of iron or of stone, would be equal to one mile of bridge-work of the usual solid form. Estimating this at five millions of money, and that two nations, or the individual subjects of two nations, are concerned in dividing the undertaking into two parts of five miles each, the difficulties and expense of the undertaking become diminished to an immense extent. Thus, with soundings only sixty feet deep, and the power of rendering arches, of only one-fifth of the usual width, equal for the support of a rail-

way, to the arches of the common bridge, it is no longer to be doubted that the labour, capital, and science of two great nations must be equal to the accomplishment of this most valuable pass.

Next it is proposed to consider the mode of constructing this communication by a causeway, from England to France. We have supposed, previously, that eight miles of the distance would be covered by the two harbours, to be formed at Dover and Blacknez, and that the intervening ten miles are alone to be converted into solid land. Now, in the great natural advantages which present themselves in the abundance of material upon the shores of both countries in those solitary cliffs, which now are without value, and in the immensity of convict labour which we are annually wasting in a six months voyage to the opposite extremity of the world, the inducements to undertake the formation of a causeway, are probably greater than any other mode that could be proposed.

Supposing, therefore, that ten thousand convicts, instead of being sent, at a cost of 100*l.* each, to Van Diemen's Land, should be brought from London to Dover, at an expense of only 2*s.* 6*d.* each, and that the 100*l.* which is expended in wasting their labour in a voyage of six months in the passage to New Holland, should be sufficient to victual, clothe, and superintend this number of convicts at Dover for a period of more

than five years. The same system being adopted upon the French shore, and ten thousand convicts and galley-slaves, whose labour is now totally wasted in dredging in the harbours of France, being brought to the hulks to be stationed at Blacknez, the work would be proceeding simultaneously from the shores of England and France—and five miles of the causeway would, therefore, be all that each nation would have to complete, till the works should meet in the centre of the sea. Ten thousand convicts, at a cost of 10*l.* each man, a full allowance for clothing, victualling, and beds, would cost the nations, or individuals, or companies to whom they might be hired, no more than the sum of 100,000*l.* per annum, which is not more than the sum which is annually expended in sending only one tenth portion of that number to Van Diemen's Land. The convicts upon the French shore, from the cheaper rate of provisions in France, might even be maintained at a somewhat cheaper rate than upon the English side, for it appears that about three thousand convicts, which is the usual number employed in the harbour of Brest, are supported at an expense of 4*s.* per week each, which even includes a small allowance of money to the convict himself; and even this expense would be diminished by the lower rate at which contracts could be taken for the clothing, victualling, and beds, for a great and concentrated body of ten thousand men.

Thus, then, we have ten thousand labourers at work on either side of the channel, and the cliffs which are to be taken down lie immediately upon the shore, are easy of excavation, and, in their present state, mere solitary mountains, and therefore, not required to be purchased at the value of cultivated land. With all these advantages, let us suppose that the pass shall be formed at the rate of only one mile in the year from either shore, and thus occupy a period of five years, and to be completed by the labour of ten thousand convicts, in one hundred gangs, of one hundred men each, with one hundred lines of tramway upon a pass one mile wide. The whole expense, therefore, of completing the English portion of the work would be about 500,000*l.* for the support of ten thousand convicts for a period of five years; but allowing that one million or two millions were required for superintendence, tools, and the facings of the causeway by metal or hewn stone, and that a similar expenditure were incurred by the people of France, and that the whole undertaking could even be completed for a sum of 5,000,000*l.*, still we shall presently perceive how trifling a sum even that would be for the purchase of the countless advantages which would arise from the pass.

Having brought our convict labour into operation at home, it follows that, though the whole of the works should be destroyed by the sea there

would be no loss in the mere labour of convicts, who are now sent to a country, the great distance of which from the country at home, renders our system of transportation little other than one unqualified waste of human labour, health, happiness, and life.

That the tide flows with great force in this part of the channel is, not a disadvantage, for the material would be more perfectly embedded by the flux and reflux of the tide, and the extremity of the causeway would be defended by floating hulls, which could be moored at the exterior edges of the work. That there is no difficulty whatever in forming such an embankment is proved by the fortifications called rip raps, which exist in several of the harbours of America, and are islands of stone, formed by throwing the material in rough masses into the sea; the stones becoming so firmly consolidated by the action of the tide, that some of these fortifications mount many hundred guns.

If a passage be required to remain open for the navigation of the channel, openings may be left, or afterwards formed at the required intervals, with drawbridges attached; or the vessels passing up or down channel may pass through the harbours of Dover and Blacknez. Less inconvenience would be felt from the obstruction of the navigation, inasmuch as this land communication, if

completed, would terminate the whole coasting trade

In order to diminish the apparent magnitude of such an undertaking, let us now reflect upon the works which have been left to us by barbarous nations and from ages when money, machinery, and men were not so abounding as in this, the most wealthy, populous, and scientific nation that ever has flourished in the world. The pyramids of Egypt, or the Chinese wall, were undertakings of ten-fold greater labour than the formation of a land passage over the narrow sea which divides England from France. If the causeway of Caligula is directly such a work as that which is proposed; for this Emperor constructed a clear land passage across the Bay of Naples from the Bay of Baiæ, to the Mole of Puteoli, where the remains of it are visible to the present day. The work is described by Suetonius as a bridge which formed a complete land passage across the whole Bay of Naples; that senseless tyrant having constructed this gigantic work for the purpose of defeating the prediction of soothsayers, that he should reign no longer than he could drive his chariot and horses over the sea. The work was constructed by chaining ships together two abreast, and these were sunk, and afterwards covered over with soil, and thus the whole was converted into a solid road across the Bay. Now this is the precise description of causeway which

it is proposed to erect between England and France, and some useful hints may even be taken from the description which Suetonius has given of the work. Thus the sinking of the hulls of ships might be adopted here where old hulls are infinitely more plentiful than in ancient Rome, and even old boats, barges, and craft of any other description might be bought or even made of slight materials for the purpose of being filled with soil and sunk at the edges of the work. If, then, such works have been seen in barbarous times, and if China possesses canals three thousand miles long, and a wall of solid masonry of one hundred feet wide, and fifteen hundred miles long, what is there that the English nation may not attempt? Though the sea from England to France were a hundred miles wide, the work would be a molehill to a nation possessed of advantages in labour, capital, and science, such as never were accumulated in any nation of the world.

Indeed, there is not only no difficulty in forming a causeway of a single mile wide between England to France, but labour, capital, and material so abound, that a very great portion of the English channel might undoubtedly, under the new system of transporting the material, be converted into solid land. The regular employment of convicts in such operations would, in time, not only level the present useless Downs of

the coast, but would also redouble the quantity of land in the portion which thus would be gained from the sea. Thus, if the present site of the Downs for five miles inland, and twenty miles along the coast, were taken down by convicts and transferred into the sea, this, in the average triple height of the cliffs to the depth of the sea, would cover the entire channel for a distance of twenty miles wide and twenty miles long, and thus an area of five hundred miles of land might be gained from the sea. This isthmus could then be covered with soil, mud, or manure, at a very reduced expense by the railways from England, Belgium, or France, and would be situated in the mildest climate of England, and rendered valuable by its contiguity to Belgium and France.

But to those who do not perceive that England is yet only in the dawn of its prosperity, that in a hundred years, a hundred millions of people will be inhabiting these islands, that the hundreds of millions of money which formerly were wanted in war, will now expand into thousands and tens of thousands of millions through the cultivation of the acts of peace, it is visionary to foretel that our posterity will enlarge their domains by the conquest of kingdoms from the sea.

A tunnel could be constructed from the extremities of the two harbours proposed, and would be therefore only ten miles long. Also buildings similar to lighthouses might be erected in the

channel, through which shafts might be opened for the purpose of proceeding with the excavation from a number of points simultaneously, and these also might be left permanently open to light and ventilate the work. It is to be observed in favour of this mode, that the chalk of which the substratum is composed is soft of excavation, and would be at all times dry, no springs being ever found by the geologists below the superior surface of the chalk.

Whether a floating bridge could be advantageously contrived, or a steam ferry-boat upon a great scale, moved by many engines, and from its power able to pass with regularity in all conditions of the weather and the sea, may also be ranked amongst the suggestions not unworthy to be made.

Thus, then, for the present, we sum up the calculations and arguments already set forth as proving, first, that a harbour is now, and upon the completion of the railway to Dover, will be infinitely more required at any cost whatsoever to be found; secondly, that from natural causes no such harbour now exists, or without reaching the clear bottom and deep sea, can be permanently made; thirdly, that the great streams of trade which the railways through France and from the northern states will bring to the vicinity of Calais, render the construction of a similar harbour to be equally required upon the opposite shore;

fourthly, that these harbours and works will cover the channel for a distance of eight miles, and leave only ten miles of sea between England and France, and that in the abundance of material in the cliffs upon both shores, and accumulation of convict labour in the prisons of both nations, the further proper land communication may be formed at a very inconsiderable cost.

CHAPTER IX.

Central position of the pass amidst the European states—Railways from Calais to Paris, and the Mediterranean sea—Another great line from Calais through Belgium, Holland, and the Hanse Towns to the Baltic Sea—Calculations of revenue—Bridges between nations more required, if practicable, than bridges between towns—Objections to the effect upon the coasting trade removed—Importance of the reciprocity of nations.

It is next intended to shew the commercial and political changes which would result from the formation of this land communication between England and France.

Upon arriving at Calais, the extremely fortunate position of that point engages our attention, since we stand at that place, in the very centre of the great European nations, and at an equal distance from the Baltic and the Mediterranean Seas.

Here, then, the sites of two great lines of railways present themselves to the view, to the north and to the south, the first passing through Belgium, Holland, and the Hanse Towns, to Hamburgh, and Lubeck on the Baltic Sea. The distance from Calais to Lubeck is about four hundred and eighty miles, and this line would take in the whole intervening trade of that great commercial quarter of Europe, with the whole trade

of Belgium, Holland, the Hanse Towns, and even Russia, Sweden, and the nations upon the Baltic Sea, would pass upon this road from Lubeck to all parts of England, Scotland, and Wales, and to the French harbour, for all quarters of the world. The entire coasting trade of Europe would be annihilated, the whole of the iron-bound coasts of the northern seas avoided, and iron, timber, and grain of the Baltic nations conveyed in one quarter of the time and one quarter of the expense. The toll from the extreme distance at Lubeck at one penny per ton, per mile, would amount to 64*s.* per ton, from the Baltic to the place of export in France, and the annual losses of merchandise by shipwreck along the coasts of our own islands and the whole of the Baltic and the northern seas would thenceforward be saved by the change. Here, then alone, and without estimating the saving in the cost of the conveyance of passengers and mails, and the general extension of commerce and its attendant civilization throughout the northern nations, is an amount of tonnage which would repay the construction of a line of railroad from the Baltic to the English Channel, and of the land-passage into England, although fifty millions of money should be expended upon the work.

But this is only one of the numerous streams of trade which here would flow into England across this pass. For Calais is also equi-distant from

the Mediterranean, to which sea at Marseilles is precisely four hundred and eighty miles, and already lines of railways have been projected, from Calais to Paris; and throughout the whole length of France. This would create a clear passage for waggons from Marseilles, Paris, and all quarters of France, to London, Birmingham, Manchester, and to the eastern and western seas. The extreme distance from the Mediterranean, at Marseilles, to London, will then be about five hundred and eighty miles, and at 1*d.* per ton, per mile, the charge will be less than 3*l.* for conveying the fruits, wines, and silks of Turkey, Spain, Italy, and Greece, our manufactured exports being also conveyed to all those nations at a corresponding rate; and thus a navigation of two thousand miles being cut off from the Mediterranean to England, the tonnage will be conveyed in one tenth portion of the time, and with further improvements in railroads at one quarter of the cost of navigation, whilst not another ton of merchandise will be in future lost upon the sea

Let us then, return to estimate the revenue which would result from this railroad from England to France.

All the lines of railways to meet and concentrate at Calais may be estimated from certain calculations upon the trade and population of the various countries through which they will pass, at about nine millions of tons per year, but as several mil-

lions of this amount will probably consist of exports and imports from Holland, Belgium, and France, to the East and West Indies, and various other quarters of the world; and as this portion of the trade will not proceed beyond the harbour of Blacknez, the whole amount of tonnage which will pass and repass upon the railway from Dover to Blacknez, may be taken at about five millions of tons. This does not include the foreign trade of England to the East and West Indies, and North and South America, which will not proceed beyond the harbour of Dover; nor does it include the supposition that the extension of commerce and population, through the rising up of those works, and the accumulation of capital through the abandonment of war, will probably double the amount of the trade in the course of a very few years. Estimating, then, the entire tonnage which would pass upon the railroad from England to France at five millions of tons per annum, exclusive of passengers and mails, the conveyance of these five millions of tons of goods would require about one hundred steam boats of a burthen of two hundred tons each; allowing each vessel to load, sail, discharge its number of waggons, and to return with another such cargo within the average, in all weathers, of a single day. The cost of building and upholding these one hundred steam boats, at a cost of 100*l.* per diem for each vessel, would amount to the sum of 3,000,000*l.* per annum; or should the

system of steam ferry boats be adopted, the expense would be not very extensively diminished, and a toll of about 15*s.* per ton upon five millions of tons of merchandise would be required for the expenses of conveyance by steam. On the other hand, we have seen that the land-passage may be constructed for a sum of perhaps less than five millions of money, and therefore a toll of 1*s.* per ton upon five millions of tons of goods will provide a revenue of 250,000*l.* per annum, or a dividend of 5*l.* per cent. upon the capital employed in the formation of the pass; and this, without including the conveyance of many millions of passengers to every quarter of the European states. Thus, the land communication will be 1,500*l.* per cent. cheaper than steam navigation, and will be the most secure, pleasant, rapid, and direct method of travelling over the sea.

Indeed, the advantages of a bridge upon a great scale across the sea, are precisely similar to the greater advantages derived from bridges than by ferry boats over rivers, excepting that the connexion of nations is infinitely more profitable than the connexion of towns; and, indeed, the necessity is not so great of constructing roads, bridges, and canals, between the cities or districts of England itself, which from similarity of productions in agriculture and manufactures are not so dependent upon an interchange of commodities, as two nations, such as England and France, each excelling in

the arts, luxuries, and food, unattainable to the other by reason of the diversities of climate, and different habits of trade. Though no bridge should exist between two of the agricultural counties of England, the loss would be less where each could produce corn, than though no bridge should exist to convey, at a cheap rate, the wine, silk, and other agricultural luxuries of France, which in England are forbidden by the climate to be produced, and yet are required to the comfortable enjoyment of our lives. Indeed, it is the glory of the present age that these truths are at length acknowledged by the world. The disappearance of the ancient vulgarity of our views towards foreign nations, and the repentance with which so many hundreds of millions of money are now seen to have been employed not in feeding, educating, and refining our own population, but making one vast slaughter-house of the neighhouring states, render no longer doubtful the beneficial consequences of removing the barrier between these islands and France, and the conversion of the whole of the European states into one uninterrupted chain of solid land.

It may be objected to the removal of the the sea-passage between England and France, that this will throw out of employment the many thousands of seamen and vessels employed in the coasting and general European trade, which will become the undoubted result; of transferring to the railroads the whole of the present

traffic upon the sea. But the seamen now engaged in conveying the commodites by sea will find employment in the almost unbounded new channels of commerce, which this change will have a tendency to create in our inland and our foreign trade. Besides the fields of employment which the constructing, repairing, and conducting the lines of railways which are about to come into existence, there is the rapid extension of manufactures, and consequent great multiplication of exports to those foreign nations to which we must still be compelled to travel by the sea. The iron, cotton, and earthenware exports from Lancashire and Staffordshire will be so cheapened in production by the cheapness of transit, that ten times the present number of persons will be employed in England by this extension of these manufactories. New fields of labour through the carrying of railways through districts of iron, copper, coal, lead, clay, and other elements of manufactures, now inaccessible by reason of the absence of roads and dearness of transit, will also furnish employment for future millions of the people of these islands. Agriculture, also, will be extended by the covering of now barren situations with lime, soil, and manure, which will be carried at so small a cost by the railways; and we have also seen the probability that the horse will be banished from all employment in agriculture, and that the gross produce of

the soil will be doubled by garden cultivation when all England shall be cultivated by the spade. The land upon which the timber now grows for the building of ships, and that which is occupied for the growth of the flax for cordage, cables, and sails, all will come into cultivation for the food of man; whilst the corn, the coals, and the cloth, now annually wrecked upon our coasts, would suffice for the subsistence of whole millions of men. If, therefore, there promises to be no deficiency of employment in manufactures, agriculture, and other profitable occupations, it would surely be more desirable that our population should be withdrawn from the very dangerous, useless, and uncomfortable occupation of the sea. Navigation is an employ ment of constant privation, hazard of existence, and sighing after home, and the sea is an element which, in the words of the enlightened Collingwood, "is not natural to man." Indeed, if it were required that a part of the population should be provided with employment upon the water, it would be more economical and humane that the requisite number of bridges over the rivers of the country should be demolished, that the seamen be employed in the ferrying of passengers and merchandise, as a more secure and comfortable mode of providing them with a subsistence, without the hazard of their lives in carrying passengers and goods across the sea. It is only,

however, through our ignoble views, and the mismanagement of governments in the changing circumstances of the world, which occasions us to talk about the danger of over-production, over-trading, and over-population. Were the enterprise and industry of states not obstructed by the existence of monopolies, there would be no such grovelling fears about the possibility of too many people coming into the world. The time will arrive when human life will be valued more highly than in this generation; when time spent upon the sea will be considered a mere waste of the existence of man, and when policy will direct to the abandonment, to the utmost of our power, of an element upon which capital is annually wasted in millions, through the sinking of cargoes of money, fuel, clothing, and food; and, that when goods can be conveyed by waggons at one-tenth portion of the expense of navigation, the very building of vessels will be viewed as a waste of the timber and iron of the world.

CHAPTER X.

Return to the main line of British railroads to Portpatrick in Scotland—Land communication with Ireland proposed—The soundings and islands between Portpatrick and Donaghadee described—Circumstances favourable to the formation of a causeway—Proposal to employ the army in the construction of the work.

HAVING now traced out an uninterrupted line of railways from Glasgow to Manchester, Birmingham, London, Dover, and the Baltic and the Mediterranean Seas, I propose next to complete this great chain by a railway across the Irish Channel, which shall join Ireland to England, and thus form one line from the Atlantic to the Irish Channel and the German Ocean, completing the connexion of all the European seas.

The mode of constructing this pass, after the description of the mode of constructing the passage from Dover to Calais, can be given in a very few words.

We have seen that the line of railways already described as passing from Manchester to Carlisle; and from Carlisle a branch was proposed to be carried westward to Portpatrick, a distance of about ninety miles.

From Portpatrick to the Irish shore, above

Donaghadee, and direct across the cluster of islands called the Copelands, is a distance of about fifteen miles; and here it is proposed to station bodies of convicts, paupers, or regiments of soldiers, upon both shores, and upon the Copeland Islands, for the formation of a causeway of rough stone, from shore to shore. Though the distance from land to land is about fifteen miles, yet the water is so shallow from the Irish shore to the Copeland Islands, that the labour of filling up that portion of the sea will be comparatively slight; and the extreme point towards Scotland being about five miles from the Irish shore, and the average depth not more than about four fathoms, the difficulty and expense of forming that portion of the work becomes so small, that we may almost consider the causeway as being only ten miles in length, from the Copeland Islands to the coast of Scotland. The material contained in the Copeland Islands will more than suffice to carry the causeway from the Irish shore to their extreme eastern side, and the remaining ten miles are to be covered from the opposite shore. The soundings here are, from the coast of Scotland, eight, ten, twenty, thirty, and forty-five fathoms into mid-channel, where the depth for about one mile descends to ninety-eight, and thence becomes gradually shallower again towards the Irish shore, in thirty-five, twenty-five, and twelve fathoms, to about eight at the eastern ex-

tremity of the Copeland Isles, and thirty-five fathoms being the average depth of these nine miles.

At Portpatrick the mountains overhang the sea for miles along the coast, and material is thus to be procured to any extent, whilst tramways may be laid upon both sides of the causeway, and also bank into the country,—thus diminishing the distance of transporting the material to the extremity of the works as they are carried into the sea. With this great advantage in the reduction of the expense of transport, which the iron roads now create, added to the abundance of material in a solitary and valueless situation amongst the mountains of Scotland,—and the probability of ores, coal, or valuable beds of stone being found in the excavation of those peculiarly promising hills, with the value of the sites so gained to be afterwards converted into cultivated land,—and the gaining of a railway across the sea without the expense of purchasing the land for its foundation, —and the whole work from Ireland to Scotland thus executed by rough labour alone,—these present a sum of advantages, without reference to the political consequences of the formation of these islands into one body of land. Estimating its completion at five millions of money, and that no toll whatever should be levied at the pass,—yet that sum would, in a single year, be repaid by the saving of the expenses of the navigation

between England, Scotland, and Ireland,—and the prevention of the loss of millions of property, which then would be transported in security upon railways by land, but which is now annually lost upon the shores of that iron-bound sea.

As the distance is only ten miles from the extremity of the land at Portpatrick to the Copeland Islands, and only about seven miles from the soundings in eight fathoms up, on either side, to which a wall could be made with comparatively small expense, it is probable that a bridge of seven miles could be formed. The depth is too great for the use of coffer-dams; but, buttresses could be constructed upon the principle of rip-raps, by throwing the loose stones into the sea, and thus raising up islands equally durable as rocks, whereupon to rest the works of the bridge. It is to be observed, that the bridge might be then carried from the first buttress without other support than projecting scaffolds from the extremity of the work, and thus a railway would be formed for the waggons of stone to be emptied at the spot where the succeeding buttresses were required to be formed. It must be fully borne in mind, in these operations, that the tramways to be used, have all the advantages of the system in the diminution of the cost of transporting the material to the sea. To propose the levelling of mountains, and throwing their volumes into the sea, without a cheaper power than com-

mon horses and carts, would be an utterly impracticable scheme; but, as iron rails will enable one horse and one driver to carry a load which can now only be carried by twenty horses and men, that grand cause of the expense of these undertakings is thus seen to be diminished to one-twentieth part of the amount upon the former scale.

Should the construction of a tunnel be worthy of consideration there is the obstacle, that the work must be carried almost six hundred feet below the level of the sea, in order to avoid the extreme depth of ninety-eight fathoms, which exists in mid-channel as before described. But still the expense of constructing the work would be the same at whatever depth it might be carried, with the exception of the expense of the approaches, which would increase with the depth. The real distance to be excavated might be reduced to about seven miles, from openings at the extremity of the shallow soundings, to be filled over at a slight expense from either shore. At the Copeland Islands, the railway would emerge and be carried upon the embankment to the Irish land. The lowering and elevating the waggons might be effected by a stationary steam-engine at either extremity of the work.

Should these proposals be upon too large a scale, at least the shallows from Donaghadee to the eastern side of the Copeland Islands, and from

Portpatrick to the deep soundings may be covered as proposed, and the distance between Ireland, Scotland, and England, thus be reduced to about seven miles. Then, with steam-ferries of great power, waggons may be transported from shore to shore ; and the railway-tracks being of uniform width in all quarters of the kingdom, may proceed upon their destination, without the expenses of unloading, reshipment, and delay.

The celebrated Mr. Brindley, for years, had his eye fixed upon this pass from Portpatrick to Donaghadee. He proposed to connect the islands here by a kind of floating canal, but it cannot be discovered that he has left his project behind him in a regular or demonstrable shape. It seems, however, that he perceived no difficulty in constructing his work, in a manner which should defy the resistance of the sea.

Before passing on to the political consequences of this junction of the kingdoms, it may be well to point to the economy of employing the troops in this or similar national designs. Soldiers, from their physical capabilities, habits of subordination and uniformity of co-operation, are peculiarly well fitted for employment in works upon an extended scale. Officers, also, from the portion of their education which relates to military engineering, are well qualified for the superintendence of such works. For twenty years scarcely a shot has been fired, whilst daily the prospect of employ-

ment in military operations becomes more distant, by reason of the ascendency of the commercial principle amongst the nations; and the military occupation may be said to be almost gone. This change would render the troops more popular with their fellow-countrymen, and increased pay, both to officers and men, could be afforded through this employment of the army in the pursuits of peace amidst the intervals of war.

CHAPTER XI.

Review of the present commercial relations of England and Ireland—True causes of the poverty of Ireland and the wealth of England—Manufactures the principal source of English wealth and national power—They are founded upon steam-power—Ireland cannot have steam-power because destitute of coal—Agriculture shewn to be not the great source of national wealth.

HAVING thus seen that the junction of the three kingdoms is not only practicable, but through the extraordinary accumulation of money and of labour, which we possess in this nation, a work in reality of very easy execution, it will be good to dwell for a time upon the general relative condition of England and Ireland, and the manner in which these two nations are rendered so dissimilar in circumstances, that each is to the other as a foreign land.

England is a very rich nation, and Ireland is a very poor one. This comparative wealth upon one side of the Irish Channel and poverty upon the other, is not attributed, by economists, in more than a very small degree, to the causes which are usually assigned for it—the tyranny of England, and the ages of misrule to which the Irish politicians are accustomed to say that the emerald isle

owes all her blemishes and sores. In former times, when the policy of prohibition of foreign trade was more customary with the government of England than in the present day, much tyrannical legislation most undoubtedly was practised against the woollen, linen, and other staple manufactured exports of Ireland, in order to their exclusion from the markets of England, and of the foreign states to which similar English exports were sent. But this very barbarous policy has long since been abandoned, and since the period of the Union, the exports of Ireland not only come freely and without duty into the harbours of England, but, through the corn laws, Ireland has obtained a direct participation in the monopoly which the landed interest of England has established for itself against the agricultural imports from the surrounding European states. Nay, more, the policy of commercial prohibition has not only been abandoned with regard to Ireland, but many important commmodities are subject to a much less excise duty in Ireland than in England, and every attempt that financial indulgence could offer for a reconciliation with the once injured people of Ireland, would certainly appear to have been made.

And yet Ireland remains poor, deserted, and unhappy, whilst England grows daily more contented, luxurious, powerful, and rich. Whence, then, comes this condition of things?

It is because England has manufactures and Ireland has none; because England has millions of people working in the foundries and mills of Birmingham, Manchester, and Leeds, whilst in all Ireland there is not a single manufacturing town.

This state of things has arisen in consequence of the invention of the steam-engine, a power which has entirely overthrown the ancient system of manufacturing by hand, and which has not only ruined the manufacturers of Ireland, but is daily ruining the manufactories of Belgium, France, and all other European nations, and even has thrown out of employment the silk weavers of the East Indies, although labour is so low in that country that the wages of a hand loom weaver are not much more than 3*d.* per day. Even in the Empire of China, this effect of the steam engines of England will now rapidly be felt, for the abolition of the monopoly of the East India Company will occasion the fabrics of England to be introduced at a price which will throw out of employment the manufacturers of that country, and bring on great disasters in an empire already overflowing with a discontented population. The insurrectionary movements at Lyons have not been occasioned by political animosity towards the ruling power so much as by the low wages, want of employment, and general overwhelming distress of the hand-loom silk-weavers of France,

since the trade has been drawn, by the alteration of the silk duties of England, towards the mills and the power-looms of Macclesfield and Leeds. Therefore the people of Ireland may perceive that they are not alone in their sufferings, for the same cause which impoverishes their country impoverishes neighbouring states still more; and the whole world is now subjected to English influence through the ascendancy of English steam.

But whence has England the advantage in this respect, and why cannot Ireland and other nations have steam-engines as well? Because England alone has the elements of steam-power, iron ore and coal; for coals are the food of the steam-engine, and in countries where this fuel does not exist, the steam-engine cannot be brought into any extended use. So great are the advantages of England in this respect, that not only coal and iron ore abound, but exist in the same veins, and are taken up upon the same spot. Then coal is so bulky a commodity, so much of it is required for the consumption of steam-engines, and the expense of its carriage is so great, that the manufactures of iron, cotton, wool, silk and all other articles which are produced by steam-power, are seen to be concentrated at Birmingham, Manchester, and Leeds; all of which great manufacturing towns are placed over beds of coal.

The manufactures of Ireland have not only been abolished by the steam-engines of England,

but the manufactures of England itself have been withdrawn from their former seats, where, as at Norwich, coal does not abound, but must be brought from the northern counties, at an expense which gives the advantage to the districts of England which have coal directly under foot.

Thus it is that the steam-engine has surpassed all manual competition, and England alone having iron and coal, a favourable climate, and easy transit to the sea, in that country alone can this all-powerful steam-engine be brought into profitable use.

Then, this steam-engine is the maker of almost every thing that is valuable in the world—the clothing, blankets, tools, all the ten thousand commodities which are desirable to the comfortable enjoyment of our lives. In every thing excepting agriculture the steam-engine abbreviates the labour of man, in a manner so very magnificent, that every valuable commodity, excepting food, is made cheaper in England than in any other nation in the world. The country, then, which can do this for other nations, is possessed of very superior advantages for the acquisition of wealth, since food alone, which is all that other nations can produce, is not the only thing which is requisite to man; for warmth must be procured by clothing, and agriculture cannot be practised without plough-irons, pickaxes, and spades, nor armies maintained, without clothing, and swords,

and guns; and as man shall not live by bread alone, so all nations must have stockings, and blankets, and gowns, and England clothes the globe.

It is, then, the possession of her mines of coal, iron, tin, copper, and lead, but, above all, the abundance of coal, which confers upon England all her power and supereminence amongst the nations of the world, producing, by the excess of exports and imports, a favourable balance of trade with all other nations, and drawing to one misty island, the tributary gold of every foreign land. From a participation of these advantages, Ireland is debarred, by the absence of the useful metals, and the impracticability of their profitable conveyance by the sea; and, therefore, in the absence of manufactures, the whole population must of necessity be employed to overflowing upon the land, accumulated numbers contending for the soil, amidst all the horrors of men who are struggling for existence like shipwrecked seamen upon an over-crowded wreck.

And in the absence of war, and the consequent cessation of the former drains of the able-bodied population, the population of Ireland must now very rapidly increase; and if the source of the evil be not cut off, the destitution, disaffection, and the present long catalogue of evils, must very rapidly extend.

That it is not, however, to the misgovernment of England alone, that the poverty of Ireland is to be attributed, is manifested in the condition of Scotland, a country very considerably less fertile than Ireland, and which yet, since the establishment of manufactures, has been advancing with the rapidity of England herself, in wealth, population, and abundance; possessed of an extending trade to all foreign nations, the results of the foundries and the mills of Carron, Glasgow, Kilmarnock, and Dundee. Had not the steam-engine been invented, and Scotland been supplied by nature with iron ore and coal, the people of that country would now have been equally poor and discontented, as are those of Galway or of Clare; and on the other hand, if the steam-engine could have been introduced into Galway and into Clare, there would have been no Terries in Ireland to-day.

For a long train of evils will be seen to arise from the absence of the materials of the manufactures of modern times. First, there is no mode of employing the population other than upon the land, the surplus supplies of labour thence carrying down the wages of the peasant to the lowest point at which existence can be sustained. Then the income of Ireland is reduced immensely by the expenses of sending to the markets of England the corn, cattle, and other agricultural productions of the country; and by the second expense of bringing back from England the whole

manufactures which the Irish population consume. Thus the price of corn in Ireland being at all times regulated by the demand for it in England, is reduced by the cost of carrying it to that market by the sea; for a bushel of wheat which has been transported to Liverpool, through the many porterages, shipments, and landings, which it has to undergo before its final sale to the dealer in England, yet then produces only the same price with a bushel of wheat grown in Lancashire or Cheshire, and which has been conveyed to Manchester, Liverpool, or Preston, at a merely nominal expense. By this means the whole exports of Ireland are lowered in value by about fifty per cent. in the cost of transportation to the only market which exists; but were there manufacturing towns in Ireland, and did such masses of population as those of Manchester and Leeds require to be supplied in that country, then the corn of Ireland, being sold upon the spot, would be equal in price to the corn of England, and the cost of transportation being thenceforth saved, the corn which is now obliged to be conveyed to England would be consumed at a double price at home, and the agricultural income of Ireland become therefore doubled by the change.

But not only is the corn of Ireland rendered less productive of money, by reason of the expenses of its transportation, depreciation in quality in shipment, and the loss of great quantities of it

annually upon the sea; but the whole of the return cargoes of hardware, woollens, cottons, and other manufactured commodities, must be loaded with the expenses of transport, insurance, and other charges of conveyance between England and Ireland; since in England alone manufactures can be bought. The consequence of this is, that the Irishman purchases his spade at a price higher than the Englishman, though earning only one half of the wages of the labourer of Kent, and the English farmer purchases his plough-irons, cart-wheels, tools, furniture, and clothing, at a lower cost than the farmer of Ireland, and yet obtains a double price for the produce of his land. Therefore in England, all is accumulation; and in Ireland, accumulation there is none; because every Irishman must have clothing and tools, and yet in all Ireland there is not manufactured a coat, a blanket, or a spade.

These, then, are the causes why Ireland is possessed of so unhappy a population; and here also is seen the fallacy of that doctrine which our modern economists have derived from the author of the "Wealth of Nations," that the true riches of a country are contained in its land. Though England were one vast rock, where not an acre of corn had ever waved, still those four hundred millions of men, whose labour is represented by the machinery of the country, would extort an abundance of corn from all the surrounding states. As

we raise neither tea, nor wine, nor gold in England, yet is the country overflowing with all these luxurious imports from foreign nations, and England is a land of gold. Since the days of the illustrious author of the "Wealth of Nations," the steam-engine has been invented, and this has raised up the immense fabric of our manufactures, has caused a favourable balance of trade with all nations, levelled the then commercial supremacy of the Dutch, and brought into the hands of the merchants of England the regulation of the exchanges of the world.

Ireland, from natural disadvantageous circumstances, is therefore drained of her gross agricultural productions for the purchase in England of the manufactures which are indispensable to existence; and thus it is, that notwithstanding the fertility of the soil, the population of Ireland are virtually a nation of slaves, who reap that others may enjoy.

CHAPTER XII.

Remedies for the deficiency of fuel pointed out—Coal of good quality may probably be found in Ireland—The coals of Scotland may be brought across the land pass—The steam-engine may be superseded, and coals no longer required—English superiority in manufactures then would decline—Probability that the railway system will equalize the advantages of all nations.

Allowing then, that this train of reasoning be well-founded, and that Ireland is impoverished by the absence of manufactures, and that the absence of manufactures is caused principally by the absence of coal, where are we to search for the remedy for this condition of affairs?

The remedies would appear to be these: either to discover that coals do, contrary to the general supposition, exist, and of the quality suitable for the steam-engine; or next, by railways, to bring in the coals of England or of Scotland at a cost which will allow them to be profitably used, or third, the discovery of some machine for the supercession of steam power.

With regard to the first, the discovery of coal in Ireland, it does not appear that there is much present prospect of so desirable an event. It is not that no coals have been nominally dis-

covered in that country, for there are many well-known coal-fields in existence, but all are attended with some disadvantage for general and profitable use. The coals of Ballycastle in the north, are of a quality so inferior, that English coal is in use within a very few miles from the pits; the coals of Arigna are almost equally inferior in quality; whilst the anthracite or stone-coal of Kilkenny, from its deficiency of flame, can only be partially used, and from its weight and density of texture is three times more expensive in excavation than the bituminous coals of the English fields. Therefore, coals, being subject to the expense of sea-carriage from Whitehaven, Swansea, or the Clyde, are at all times two hundred per cent. dearer in Ireland than in the average of England, Scotland, or Wales.

Then that this high price of coals is fatal to all manufactures by steam power will be proved by the following calculation of expense. The supply of fuel for a steam-engine of sixty horse power is about one hundred bushels for a day of twelve hours, and this quantity of coal in the manufacturing districts of England is of an average value of 2*l.* 10*s.*, but in the average of Ireland, its value would be very considerably more than double that amount; and thence the daily difference of expense for a moderate sized steam-engine would be at least 1*l.* 5*s.* per day, or about 400*l.* per annum, for a working year of three hundred and

ten days. Without reckoning the further expense of importing the very steam-engine itself, and all the machinery of a manufactory from England, with other disadvantages, it is clear that a difference of 400*l.* per annum, or the interest of a capital of 8,000*l.* would be totally fatal to the use of a steam-engine of sixty horse power, amidst the grinding competition of modern trade.

And though the absence of steam power is the principal, it is by no means the only disadvantage which is experienced from the absence of coals. For the mines cannot be worked without fuel at a price which shall correspond with the prices in England, Scotland, or Wales. Eight tons of coal are, or up to a recent period, have been, required for the smelting of one ton of iron; and this greater expense in the fuel upon the Irish side, would be more than one half of the value of the iron produced. Even the copper mines of Kilkenny were abandoned through the dearness of coals, though that metal is so much more valuable than iron. Then no potteries can exist in such a country; not even bricks can be burnt for exportation; and the very burning of the limestone for manure adds greatly to its comparative expense. The whole domestic fuel of Ireland is also doubly dearer than the firing of the English population; for turf is a very dear material when considered with reference to the labour required for its production and the rental of the bogs. "The peasantry in

Wicklow," observes Mr. Wakefield, "informed me that 4*d.* expended in English coals, goes farther than 1*s.* 4*d.* in the purchase of turf." Therefore the whole labour bestowed upon the cutting, drying, carting, and stacking the fuel derived from the bogs, forms an immense annual waste of the labour of the Irish population; and the mass of all the sufferings of that most unfortunate nation is clearly to be traced to the absence of the cheap elements of fire.

That this will always continue to be the state of things, cannot certainly be supposed; for besides the contiguity of Ireland to Scotland, upon the western coasts of which country extensive beds of superior coals have been found, and the little probability that so abounding a material should suddenly stop short upon the Irish shore, it is probable that coal may be found in almost any country; for geological research has shewn, that this substance is of an almost universal existence, the depth and quality of the seams being the considerations as to profitable mining operations in coal. Hitherto, certainly, nothing has been found in Ireland which can compete with the bituminous fields of England, Scotland, or Wales; and, therefore, we only can direct the attention of the people of Ireland to the disadvantages arising from this absence of coal, that the geologists and capitalists may employ their powers in search of a mineral, the possession of which

would be the most effectual remedy to be found for all their national poverty, disorganization, and distress.

The next method of causing manufactures to rise up in Ireland, would be to convey the coals of Scotland across the channel by the railway which has been proposed over the causeway from Portpatrick to Donaghadee. Supposing the railway across the channel to be constructed by the labour of convicts, and not subject to a toll, then fifteen miles of the distance would be virtually saved, and the real distance from the coal-fields of Scotland to the counties which compose the province of Ulster would be an average of fifty miles. The cost of conveying coals, at 1*d.* per ton, per mile, would be about 4*s.* 2*d.* per ton, and the price at the pit being usually about 3*s.* 6*d.* per ton, the whole north of Ireland could be supplied with that mineral at a price of about 8*s.* per ton. This cost of transport might therefore be sustained and the steam-engine brought into profitable use; for Ireland is most admirably placed by nature for an export trade to the western world, and the voyage to America from the western coast of Ireland being one third shorter than from the harbours of Liverpool or Glasgow, with a clear sea from the ports, and not subject to the intricate navigation of the Irish Channel, the saving in the time, interest of money and insurance, which would arise from shipping manufactured goods from the

western harbours of Ireland to the United States, West Indies, and other quarters of the world, would fully counterbalance a charge of 4*s*. 2*d*. per ton upon the carriage of the coal. Indeed, the exports of Liverpool, Glasgow, and other English towns, must then be carried by the railways to the west of Ireland, an average distance of two hundred and forty miles, at a cost of 20*s*. per ton, or be subjected to one third longer passage to America, which will probably be more expensive than the cost of conveying merchandise upon railways through Ireland to the Atlantic Ocean, at a charge of 20*s*. per ton. There is, therefore, reason to suppose that the western position of Ireland would become an immense advantage in future trade, if the channel could be crossed without the expenses of the present navigation.

Iron ore abounds in the northern and central districts of Ireland, and the calculation follows, whether the sister material of coal cannot be conjoined for the foundation of a manufacturing system in the Irish part of these dominions. It is certain, however, that no very extensive advantage will arise if the channel be not passable by land, and if the expenses of loading, freight, and unloading the heavy raw materials of manufactures, be not overcome by the land junction of the kingdoms which here has been proposed.

The other method by which Ireland might be converted into a manufacturing nation, is through

the discovery of some cheaper and yet equally powerful machine with the steam-engine, as an air-engine, a hydraulic-machine, or such other power which should act without fuel, by the mere compression of water or of air, or by some other mode of conveying motive power. Many experiments have been attempted for this great purpose, but hitherto in vain; though in the general scientific movement which is going on around us, it is probable that some power less complex and expensive than the steam-engine is yet to come to light. Then the advantages which England and Scotland have had over Ireland, and indeed over all other nations, since the invention of the steam-engine, would be annihilated when coals, upon which that advantage has had its principal foundation, shall no longer be required. An engine which should take its power from so simple a source as the compression of water or of air, could be brought into operation in any nation, or could even some cheaper fuel than that of coals be discovered, the manufacturing advantages of England and Scotland would then be probably at an end. The turf of Ireland, though a hot substance, is too unsubstantial and evanescent to be profitably employed in furnaces upon an extended scale, though what may be done with mineral tar, and a number of other substances, is yet to be ascertained.

Thus we perceive that the commercial great-

ness of England is not altogether founded upon a rock; for the same science which gave her the steam engine, and with it the profit upon the labours of hundreds of millions of inanimate men, may yet confer upon some other nation, or upon the great community of nations, a power which may level all the advantages of this land of coal. That this should occur, and a consequent more equal distribution of wealth should result from such a change in the operations of commerce, is an event apparently much to be desired. For England, through its overwhelming manufacturing advantages has acquired too great a share of the wealth of the modern world. Through a favourable balance of trade with all nations, the whole money of the world has a tendency to flow into England, to the draining and impoverishment of the remainder of the less fortunate states. Though, certainly, this wealth is again distributed by England in the shape of foreign loans, and foreign enterprises of various kinds—and though this concentration of wealth upon a single island has given to its population the knowledge, liberality, and enterprise which again are diffused over the surrounding nations, yet have science, intelligence, and the principle of the reciprocity of nations, now taken so unconquerable a stand in the world, and war and retrogradation are in future so little to be feared; that it now would be

well that the distribution of capital should be more equal through the world, and that the mountains of English wealth should be seen to subside.

Ireland, amongst other nations, may then have a larger share of prosperity, through the not improbable decline of the empire of steam.

CHAPTER XIII.

Effect of the land communication upon the agriculture of Ireland —General improvement of that country through the opening of the English markets—Prices of produce will be raised, the bogs reclaimed, and fisheries revived—A land communication with Scotland and England will have other extensive consequences— Steam navigation shewn to be insufficient for these purposes— The union, considered in its importance to England, shewn to be over-rated—General observations upon Irish politics and trade.

But upon the supposition that Ireland shall not be destined to become a manufacturing nation, let us then see what would become its condition as an agricultural country, by the formation of a railway-pass across the sea.

First, the corn and the cattle of Ireland would then be carried across the causeway to the manufacturing districts of Scotland, in an average distance of one hundred and fifty miles. Then a ton of corn, at 1*d.* per ton, per mile, could be carried by the same waggon from the centre of Ireland to the manufacturing city of Glasgow in a single day, at an expense of 12*s.* per ton, whereas by the sea this corn cannot be conveyed from the centre of Ireland to the sea-port, and then be subjected to the expenses of warehousing, agency, shipment, freight to the Clyde, unloading there, and all the costs of delay, insurance, depreciation in

quality by the dampness and want of ventilation in the ship, under a cost of more than three times the charge of conveyance by the railway over land, even at the extreme toll of 1*d.* per ton, per mile. Neither can the cattle—the other great staple production of Ireland—be first driven to the port of embarkation, then subjected to the expense of shipment and freight, provender for a voyage of uncertain duration by sailing vessels, or of enormous expense by steam, with the insurance upon that precarious cargo, and the final expense of disembarkation upon the English shore, under four times the cost at which the same animals could be conveyed to the market in England or Scotland, by the same waggon from the centre of Ireland to the centre of Lancashire, or even to the metropolis itself. Then estimating the whole average weight of the corn, cattle, potatoes, pork, flax, and all other commodities exported from Ireland to England and Scotland to be annually five millions of tons, and a charge of more than 30*s.* per ton, being a difference of time upon the freight, insurance, and interest of money upon all this amount of exports, the full saving is thus about seven millions per annum, which would be added to the annual gains of the agriculturists of Ireland, through the rise of prices, the result of the diminution of the cost of carrying these five millions of tons across the sea.

Then, the expense of bringing back to Ireland

the return cargoes of manufactures, colonial produce, and every other foreign article of import, would also be reduced in a corresponding rate. Allowing the imports of Ireland be only two millions per annum, and Ireland being almost entirely supplied with foreign commodities from Liverpool, Bristol, and the Clyde, a further saving of about 30*s.* per ton would be effected upon the import trade. Here, then, is a total saving of ten millions per annum, allowing the rate of railway transit to be 1*d.* per ton per mile; but as we have formerly seen that the toll, in the further development of the powers of the system, will probably be reduced to one farthing, or perhaps one sixteenth part of 1*d.* per ton, per mile, it follows, that million rises upon million in the future economy of communication between Ireland, Scotland, and England, by the proposed supercession of the sea.

Then this accumulation of the capital of Ireland, through the increased price of exports, and decreased price of imports, would cause cultivation to extend, the bogs to be drained, and the rich mountain lands to be converted from pasture into tillage; when the increased price of the productions of the soil shall cause them no longer to lie dormant by reason of their unworthiness of the cost of reclamation, which is the true reason why so large a portion of the surface of Ireland now remains in a state of waste.

Then the fisheries of the western coast would rise into life, when railways should enable their produce to be carried with rapidity and economy over Ireland, Scotland, and England; then, also, many thousands of visitors would annually pass towards the romantic mountains and fine climate of the western shores of Ireland: this intermingling of the people will cause ancient prejudices, differences of religion, and even difference of name, at last to disappear; for England would be Ireland, and Ireland England; and where now eight millions of people are pining in poverty and discontent, would exist in a single century a tenfold number of the most wealthy, enlightened, industrious, refined, and prosperous population in the world.

Then all these changes are to be effected by the simplest means. By carrying a road across the sea, we invade no land, and obtain the site without expense; whilst the rough labour required for the formation of the work could be obtained by the employment of the troops now standing idle all the day long, or by the cessation of our folly in sending our convicts to be lost in the regions at the other extremity of the earth.

Here it will probably be observed, that steam-navigation has already done much in facilitating the economy of communication, and that a land passage between England and Ireland would not very extensively accelerate the movement, if rail-

ways were in waiting upon either shore. But this is not a well-founded view of the operation of steam navigation upon modern trade; for the steam-engine upon the sea, as upon railways in the form of locomotive drags, is a most expensive power, and not in use for the conveyance of the general heavy commodities of trade. The steam engine when moving upon the sea, is burthened with its own great weight, and with the weight of water, fuel, wheels, and other appurtenances which do not encumber its operations when in a stationary state. Steam navigation is indeed so expensive, that neither cattle, corn, nor any other of the usual agricultural productions of Ireland are conveyed to England by the steam-packets excepting when some rise in the markets or other extraordinary circumstances may have rendered the saving of time equivalent to the difference of expense between sailing vessels and navigation by steam. Steam-boats are, therefore, used almost for passengers alone, and though the saving of the time, and diminution of the hazard and fatigue of the travelling part of the community are considerable objects in national economy, yet these advantages are obtained at a greatly increased cost by the power of steam. That future improvements in steam navigation will considerably decrease its expense, is certainly a very probable event, but in the present state of that mode of transport, the disadvantages under which the steam engine

moves, render it, with steam locomotive engines upon railways, of not any very extensive benefit for the general purposes of trade.

But if no remedy can be found for the present miseries of Ireland, let us next inquire what our future prospects are, should that nation be allowed to remain in its present state.

Here is a population of eight millions of human beings, the poverty and sorrow of the great majority of whom is so very overwhelming, that no man of ordinary benevolence of mind can look towards them without pain. If in their present numbers, there is the utmost difficulty in the suppression of this people by military force, what will become the condition of such a population when their numbers shall be doubled, which so soon must come to pass, through the termination of the wars which formerly drained them away, the introduction of vaccination, and other scientific discoveries which now tend to the prolongation of human life? The increase of population increases the numbers of the starving and the consequent numbers to be contended with by force, and thence the most extensive convulsions must ensue from the accumulation of millions of people without bread. The wars which have ceased for the last twenty years, have left the population at their natural home; that home, from the absence of capital, is without the means of extending the provision for the multitude; even the very minute

sum for which they can be allowed to trust themselves in worn-out vessels to escape to the new world, can be afforded only by a very small portion of so destitute a people; the gates of an immense field for employment are closed by the corn laws of England, which forbid our manufactures to expand, and thus these unfortunate people seek here for employment in vain, and are forced back upon the horrors of Ireland again.

What, then, again and again is to be their condition when the population of Ireland shall be doubled, and the means of subsistence at a stand or decreased by the internal distractions of a starving population?

Either we must find the materials of food, or withdraw our armies and abandon Ireland to its fate.

Nor will the latter, if the present condition of affairs shall remain, be any loss to England, but, perhaps an immeasurable gain. For the union with Ireland has effected no real benefit to England, but has caused a great drain of our resources for the support of the armies required to keep down a hostile population. Neither has the union with England been injurious to Ireland, although the population of that country are so enthusiastic for its repeal; but on the other hand, the very armies which have been stationed in Ireland have been consumers of the provisions and forage, which are all that an agricultural nation has to sell. The withdrawal of the manu-

factures of Ireland, we have seen to have been not owing to the passing of the act of union, but to the simultaneous invention of the steam engine; those two events having been confounded in their consequences, because they occurred about the same period of time. Were the union repealed, still Ireland would remain in its present state; impoverished by the drains of its agricultural produce for the purchase in England of the manufactured commodities without which a population cannot comfortably exist. To what other country could the corn and the cattle of Ireland be exported excepting to England, the only nation where a surplus of food does not exist? The wheat of Ireland could not be exported to France, Belgium, Holland, or any of the Baltic States, all themselves agricultural nations, and possessing an accumulation of corn so great that in some of those countries it is seen in the act of rotting upon the ground. And not only could Ireland find no market beyond England for her corn, but in no country could the return cargoes of clothing, blankets, pottery, and spades, be purchased at less than fifty per cent. higher than at Manchester, Birmingham, and Leeds. But on the other hand, England could obtain from France, Belgium, or America, the grain which is now purchased from Ireland alone; the corresponding increase of manufactured exports to those agricultural nations being then substituted for the loss of the Irish trade.

Ireland, then, is a loss, a millstone, and a dead weight to its English partner in politics and trade; and the dread of a dissolution of the union, the dismemberment of the empire, and the other magnificent horrors with which this subject is usually invested, to the ear of the political economist, are mere sound and fury, signifying nothing.

The fear that Ireland should join hostile nations is now also perceived to have little real foundation; so rapid are the changes in the disposition of mankind, who no longer exist for the purpose of slaughtering one another, England, from her wealth and naval ascendancy, can forbid all war in the European quarter of the world; having, by the mere cessation of commercial intercourse, the power to destroy the revenues and create insurrectionary movements in the hearts of foreign states. Moreover, the northern nations would be directly benefited in trade by sending the supplies of grain which Ireland had then lost; and therefore it is seen that the balance of trade has become the true balance of power; that swords and staves are no longer the weapons with which the battles of the world are to be fought; and that nations must now conquer one another by the anvil and the loom;—for the age of the sword is gone.

Ireland has always been virtually a colony of England, and still is governed by that military force, which the prejudices of conquered nations

render the only means by which governments can be forced upon them from abroad. The expense of such possessions invariably outweighs a thousand-fold the benefits derived from them by the parent state. The colonies of England are an incumbrance of enormous weight, and only the country of the steam-engine could have so long supported those drains of the resources of the parent state, which all such excrescences create. The independence of the United States of America, though mourned over at the time as the death-bell of England, has in reality been one of the most valuable additions to our wealth and power; for the Americans have been subjected to taxation for the government of themselves, whilst this expenditure has been saved to the people of England, and the commerce of both nations has increased through the similarity of language, habits, and desires, and by the more ready reciprocity of a people, who now view the people of England no longer as conquerors from abroad. If Ireland were rendered independent, similar consequences would probably ensue; for it certainly is a maxim, that the worst government at home is better than the best from abroad; and were it not that Ireland is sufficiently contiguous to our shores to be embedded into England, it would become the undoubted policy of England to cut the cable of the union, and leave that island to its fate. At present, however, the conjunction of the interests of these islands promises

to become so completed by the rising up of the new system of roads, that it soon will only be inquired whether the expenditure for two governments is required for two islands, the surfaces of which are not equal to a tenth portion of many of the other nations of the earth.

Here, then, let us retrace and arrange these views.

England, through the possession of machinery, has a balance of trade against all nations, and thence the prices of all other nations must be below the prices of England, by the difference of the expense of conveying the commodities across the sea. Ireland is separated by the sea, and thence, with other nations, is subject to the loss of this difference in the expense of carrying over corn, and returning with English manufactured goods; to remedy this disadvantage, Ireland must manufacture at home the goods which she is now compelled to purchase with her corn; but these home manufactures cannot exist without coal, and of coal she is not possessed. This coal cannot be imported for that purpose, because the cost of navigation renders it immeasurably dearer than in England, Scotland, or Wales, though railway carriage would reduce its expense to a rate at which this difference might be fully overcome; this railway can only be constructed upon a land communication; and the construction of such a work is as nothing to the nation which commands the whole wealth, science, and labour of the globe.

CHAPTER XIV.

Lines of railroads required through Ireland—Line to the Atlantic Ocean on the Bay of Donegal—New harbour proposed—Lines from the Clyde to Donaghadee and the Bay of Donegal—Line from Dublin to Donaghadee, and thence to Scotland and England—Project of a railway from Valentia to Dublin considered—Central position of the Isle of Man pointed out—The intervening sea shallow, and this a favourable position for a land pass between England and Ireland.

The various lines of railroads that then would be formed through Ireland, would probably cause that country to exhibit as busy a scene as any of the counties of England itself.

A new harbour, would be required upon the Bay of Donegal, at a point due west from Donaghadee, in a distance of ninety miles, and communicating with the Atlantic Ocean through the Bay of Donegal. From the Atlantic by this railway to Donaghadee, Port Patrick, Carlisle, and the German Ocean, at South Shields, would be a clear distance by railways of two hundred and forty miles. Across this line it is probable that a great stream of trade would pass through England, Scotland, and Ireland; for this pass would cut off a navigation of two thousand miles round the English Channel to the northern European states;

and should the vessels themselves, at a future time, be conveyed upon marine railways at 1*d.* per ton per mile, or 20*s.* per ton from the Atlantic to the German Ocean, there is no doubt that the whole of the trade to and from the Baltic nations, and from the western coasts of England, and all Scotland and Ireland, would here be conveyed across the land. For this pass is in the centre of the three kingdoms, and the land is at the narrowest point.

Railways would then be carried from Glasgow, and all the manufacturing districts of Scotland, to Portpatrick, and thence the exports and imports of Scotland, from the West Indies, and North and South America, would be conveyed, at 10*s.* per ton, to and from the new port upon the Bay of Donegal; thus cutting off one third of the voyage to America, by a charge of 12*s.* per ton, for a distance of one hundred and eighty miles from the Clyde. This would be productive of great advantages to the manufacturers and merchants of Scotland, the trade of which country would indeed be very considerably extended by its proximity to the granary which Ireland then would become.

From Dublin, a line would be formed to Donaghadee, the distance being ninety miles, and one hundred and eighty miles to Glasgow, two hundred and forty to Manchester, three hundred and fifty to Birmingham, and four hundred and eighty to Lon-

don; a direct passage being accomplished from the capital of Ireland, through all the manufacturing districts of England, to the capital of England itself; the time of conveying passengers from capital to capital being not more than about twenty hours, and at a quarter of the present rate by sea.

The line projected from Valentia to Dublin, is, perhaps, too enthusiastically urged forward at the present time. Though the harbour of Valentia is certainly one third of the voyage nearer to the continent of America, yet the trade of Ireland itself to the new world is extremely small; and the passengers and merchandise from America to Liverpool, and other parts of England and Scotland, could not probably be depended upon, when again subjected to the expenses of passing from Dublin to England across a considerable portion of the same channel which it is proposed by the railway to avoid. If there be not a direct passage by the junction of the islands, it is difficult to perceive that anything of importance could be gained; so numerous are the transfers of passengers from Valentia to the English side. When a steam vessel could pass with the westerly wind which usually prevails in about two days from Cape Clear to Liverpool, it is not to be supposed that this vessel should stand upon a lee shore, a distance of one hundred and fifty miles to the harbour of Valentia, without any probable

saving of time in the passage to an English port. Moreover, this railway would be a mere road into England, and would be of no very extensive service to the people of Ireland, who are possessed of so very small a portion of the commerce with the western world.

Here it may be mentioned, that the Channel, at the Isle of Man, is not more than forty miles wide; the soundings being an average of about twelve fathoms, the utmost depth forty-five, and the line passing direct across the northern portion of the isle. Though three times the distance of sea here is to be covered, as from Portpatrick to Donaghadee, yet the depth is not one third; and as there are mountains of material in the Isle of Man, the construction of a causeway might proceed simultaneously from four points, and the difficulty and expense might be not greater here than from Portpatrick to Donaghadee. This pass would be more in the centre of Ireland, and would enter England also at its centre, in Lancashire; and therefore in the event of the more northern causeway being completed, another might be formed, across the Isle of Man, at some future time.

CHAPTER XV.

Proposed railroad from Limerick to the Irish channel—Importance of this line—A navigation of 1500 *miles towards England will be thus cut off—Consequences of this upon the agriculture and general condition of the population of the centre and the west of Ireland—Line to be carried to Dungarvon Bay—Proposed improvement of that navigation—Further influence of the harbour and railroad upon the fisheries of the Nymph Bank—The Shannon superseded by this railroad to the Irish channel.*

THERE is another line of road, of great immediate importance to Ireland, which is dependent upon no completion of other undertakings, and which ought not to be postponed.

This is the long projected line of railroad from Limerick to the Irish channel at Youhall, Waterford, or Cork.

From Limerick, which is the centre of the trade of the many counties watered by the Shannon, is not more than a distance of about fifty miles to the Channel, whereas by the Shannon to the Atlantic Ocean, and thence round to the same point, is a distance of about fifteen hundred miles.

Here we perceive the great cause of the distress of the central and the western counties of Ireland, and how its remedy may be found in the magic influence of railway transit to the sea.

For the whole of the corn of the centre of Ireland, of the rich counties of Limerick, Tipperary, and the surrounding districts, can be sold only at the port of Limerick, because there alone exists an open navigation towards England; land carriage to Cork, Waterford, or Youhall, being impracticable, because more than equivalent to one half of the value of so cheap and yet heavy a commodity as corn. Accordingly this expense of transporting corn from Limerick to England, which is the only market to which it can be carried, must be deducted from the price of the commodity; and grain from that cause is at all times twenty-five per cent. cheaper at Limerick than at Waterford or Cork, or is only preserved upon an equality of price by the cessation of tillage and consequent decrease of the supply. This state of the markets is very obviously occasioned by the shipment of corn; first, from Limerick, which is sixty miles from the Atlantic Ocean, and thence round the south-western coasts of Ireland, with a westerly wind and lee-shore from Limerick to Cape Clear, and consequently a great loss of time, damage to the grain by long continuance at sea, and expenses for insurance in beating round many hundred miles of that iron-bound coast. In consequence, then, of this great cost for freight, damage, and loss of interest of money for the month which is sometimes spent in clearing the Atlantic coast, the grain so

shipped from the Shannon can only be sold at Limerick at twenty-five per cent. less than the grain shipped at Waterford or Cork, which can be carried to Liverpool or Bristol in two days with the fair wind which usually prevails for those ports. It follows, then, from this low price of corn at the market of Limerick, tillage is discouraged, and many hundreds of thousands of acres of the richest of the soils of Ireland, in the counties of Limerick, Tipperary, and Kilkenny, are devoted to pasture, because cattle can be driven, although an inanimate substance such as corn cannot be carried at a suitable expense to the markets of Youhall, Waterford, or Cork. This impossibility of profitable tillage in the centre and the west of Ireland by reason of the low price of grain, through the distance from England, is the real and substantial source of all the miseries of the Irish population. For two hundred acres of pasture can be managed with three labourers, throughout all its departments, whereas the land sown in wheat, potatoes, or oats could not be cultivated with less than treble that number of human hands. Not more than one labourer in three has a field for employment, and thence the redundant population, distress and insurrectionary outrages of the centre and the west, and by the regurgitation of the unemployed labourers upon all other parts of Ireland, the general misery and discontent of the whole eight millions of the Irish population. For the

farmer in Tipperary and Limerick not only must continue his land in pasture, though not one-quarter of its capabilities is obtained by that mode, or if it produce corn, must sell that corn at twenty-five per cent. less than the same would produce at Waterford or Cork, and fifty per cent. less than it would produce at Liverpool or Bristol, but must additionally pay twenty-five per cent. more for his English manufactured goods, than the farmer of Cork, and fifty per cent. more than the farmer of Lancashire pays for his clothing, blankets, and tools. Then the labourer in Tipperary and Limerick has not employment for more than one third portion of the year, and out of that third portion of the wages of a fully employed labourer in Lancashire or Kent, has to provide his clothing, tools, salt, fuel and tobacco, at a price enhanced twenty-five per cent. by the freight, insurance, and delay of importing them from England to Limerick, a distance of fifteen hundred miles, and from these plain causes all comfort is inaccessible to the mass of the people, and the most fertile districts of Ireland present only one wide scene of hunger, rags, barbarity, disaffection, and revenge.

But were a railway constructed from Limerick to the Irish Channel, in a distance of fifty miles, the whole of these disadvantages would at once be at an end. For a railway might be carried from Limerick to Dungarvon Bay, at an expense

of 1,000*l.* per mile, and the distance being fifty miles, the whole sum would amount to not more than a capital of 50,000*l.* and a toll of 1*d.* per ton, per mile for horse transport would provide an abundant return for the capital invested in the work. If, at 1*d.* per ton per mile, the wheat, oats, barley, potatoes, or beets of the district upon the Shannon could be conveyed in one day from Limerick to Dungarvon, this would be not more than an expense of 3*d.* per bushel for conveying one bushel of oats in perfect condition, and without the expenses of insurance and delay. But by the turnpike road the carriage of the same bushel of oats would be twelve times that sum, or about 3*s.* per bushel, an expense at which so cheap a commodity could not be profitably conveyed. If, then, a bushel of oats could be carried at so reduced a cost by a railway to the Irish Channel, and the harbour of Dungarvon would be about fifty miles nearer to England, and might be made more accessible than either Waterford or Cork, it may be supposed that these advantages would outweigh the slight expense of transit from Limerick to the sea, and that the prices at Limerick would settle down to a level with the prices at Waterford and Cork. Then, if the difference in the markets could be equalized by a railway, this would add twenty-five per cent. to the value of the whole of the grain brought to market at Limerick, and would also diminish by about twenty-five per cent. the value of English commodities, which

would be brought from Dungarvon at that reduction of cost. Therefore the scale would be entirely turned by this cutting off a navigation of fifteen hundred miles from Limerick to the markets of England and Wales, and consequently tillage would very rapidly extend in those fertile portions of Ireland, and with extending tillage, would arise new fields for the employment of those crowds of labourers who are starving in the lanes of Limerick, or dying in the fever houses from hunger and disease, or ranging the country as Terry Alts and Whitefeet. This railway presents, indeed, one of the noblest fields which philanthropy and science can possibly explore; for it will add fifty per cent. to the annual agricultural revenue of the counties of Ireland where the distress principally prevails, this will create a rapid accumulation of capital, will find employment, wages, energy, and content for the now despairing thousands of the poor; will bring the Terries from the mountains to the wheat fields and the barns, and will bring the most distant districts of the Shannon into communication with the markets of England and Wales, and in five short years this single undertaking will carry its vivifying influence to the farthest shores of Clare.

The line should be carried from Limerick, not to Waterford, Youhall, or Cork, but finally to the channel upon Dungarvon Bay. If two or three hundred thousand pounds of the public money were expended in the construction of the

railway, and the enlargenment of the harbour of Dungarvon, and no return were exacted beyond the almost nominal toll that would be required for the future annual repair and management of the works, still this expenditure would be a warrantable departure from the general rule, because the changes which it would create in the centre and the west of Ireland would supersede the military force, which now is required for the suppression of everlasting faction and revolt.

Another great benefit to be derived from the construction of a new harbour upon Dungarvon Bay, would be found in the improvement of the fisheries of the channel which a place of refuge would create. At the present time the Nymph Bank, which lies opposite to the southern coast of Ireland, and seems laid down by nature at the door of the people of the counties upon the channel, cannot be fished in the winter season by reason of the absence of a harbour in the gales which arise from the south-west. Neither Youhall, Waterford, or Cork, can be entered at all times, and from this disadvantage, fish, which is so cheap in those places in the summer season, is equally dear in the winter months, although the Nymph Bank would supply millions of cod, ling, hake, and other white fish, throughout every season of the year. The fishermen would then be at all times employed, and a great market would be opened for fish to the countries through which the

line of railroad would pass, causing thereby a most important addition to the subsistence of the people of the southern counties of Ireland in the fish which now are left and wasted in the sea.

The abandonment of the Shannon, which this opening, as it were, of a back-door to England would create, would also be the cause of much economy of money, which now is required for the improvement of that in reality most useless stream. The whole Irish influence in the government has been exerted in the late Sessions of Parliament, and committees have been besieged with projects for the improvement of the navigation of the Shannon, though nothing can be done but to throw more hundreds of thousands of pounds after the millions which already have been sunk into the Shannon and those senseless lines of canals which have been formed through a country without trade. The fisheries of the west of Ireland are also very loud in their demands upon the national purse, although it is apparent that the fisheries, like the corn fields of Ireland, are in ruins because of their distance from England, and can only be resuscitated when a direct road shall be found to the only place where fish can be sold. The railway from Dungarvon to Limerick, by bringing up the salt of Cheshire at one half of its present price, would itself cause a greater revival of the salmon fisheries of the Shannon and the western coast, than any, however extensive, expenditure of the

national wealth. When fresh salmon could be conveyed to Bristol or Liverpool, in thirty-six hours, from the Shannon, which are detained by a navigation of twenty days round the western coast, it is clear that the fisheries would then rapidly revive, and that the present distance from England is the true reason why the western fisheries decay. If Parliament cannot, therefore, cut off this circuitous navigation of fifteen hundred miles, it can do nothing effectual by any expenditure whatever upon the fisheries or the agriculture of the country watered by the Shannon. The 40,000*l.* which has been advanced for the improvement of the harbour of Limerick will, in all probability, be attended with no benefit to its trade, for no harbour will be wanted if the railway communication be carried to the channel, and if such a work be not undertaken, then 40,000*l.* expended upon the improvement of a harbour will not create a trade, of which the elements do not exist. Estimating the waste of time through the drought and the floods, with the counteraction of the advantage of the current in one direction by its opposition upon return, it is considerably to be doubted whether many of the rivers have not been valued beyond their deserts, and been, in reality, more expensive than a common turnpike road. Certainly the Shannon is not worthy of any further expenditure of the national money, and notwithstanding the magnificent praises which have been bestowed

upon this river, we soon shall desire only to divert it from the fertile districts over which it spreads itself into locks which cover many thousands of the finest calcareous soils in the world. Our Irish friends are, therefore, a century too late in their proposed further Parliamentary molestation of the Shannon.

CHAPTER XVI.

The growth of tobacco in Ireland considered—Its prohibition an error—Might be made a great cause of wealth—The soil, climate, and cheap labour of Ireland all favourable to the cultivation of that plant—The prohibition shewn to have had other unfavourable consequences upon the progress of the country in wealth.

The subject of the waste condition of the centre of Ireland, through the absence of a market for grain, leads here to reflections upon a most important error which has been committed towards that country, in the prohibition of the growth of tobacco, by an Act of Parliament which was passed in the year 1832.

By this measure all planting of tobacco in Great Britain was prohibited under heavy fines, and the whole stock of native Irish tobacco was directed to be bought from the cultivators, for the purpose of being destroyed. This extraordinary enactment was immediately carried into execution, and eight hundred thousand pounds of tobacco were accordingly purchased from the Irish growers, and burnt at the Dublin custom-house in the course of the following year. Whatever were the causes of this measure, (which passed without opposition or remark) whether fear for the revenue, from the greater difficulty of col-

lecting the duty from the Irish cultivator, than from the merchant who imports the tobacco from America, or whether in favour of the shipping interest the carrying trade in tobacco was intended to be preserved, or whether the impolicy of allowing land, which otherwise would grow food, to be converted into the growth of a foreign luxury like tobacco, or whatever other of the ancient mole-eyed motives of the financiers gave rise to this prohibition of tobacco, at least it was not required to destroy the crop which already had been grown. For those eight hundred thousand pounds of tobacco might have been sold for exportation to Holland, Russia, or some other of the tobacco buying countries, thus giving the carrying of the cargoes to the shipowners, and brought back 100,000*l.* in money to be applied to the purposes of the state, or to the furtherance of the public works of Ireland, or even to have purchased a great coat for each of the peasantry of Ireland would have been better than to have burnt so valuable a portion of the products of the earth. By this destruction of the Irish tobacco, we merely made room for the tobacco of America in the markets of the European states; and to continue the senseless character of the transaction to the last, this tobacco was burnt at an expense of about 250*l.*, although it might have been sunk into the sea at an expense of about 5*l.*

But this waste of the public money is a trifle light as air compared to the consequences to the people of Ireland, from the prohibition of the growth of one of the most valuable crops, and one which is peculiarly suited to their air and soil. For tobacco is a plant which grows in the greatest luxuriance upon the new soils which abound in the centre and the west of Ireland, and its cultivation in the counties of Tipperary and Limerick, and upon the inexhaustible soils upon the lower region of the Shannon, would rapidly have become a most extensive source of wealth. A crop of tobacco is more valuable than three crops of wheat, or five crops of oats, potatoes, or other agricultural productions, at the prices which usually are obtained by the Irish cultivators, and being a plant containing great value in a small compass, its carriage to the English market, by the common road to the Irish ports could very readily have been borne. For if the tobacco of Kentucky can be conveyed down the streams of that state to the Ohio river, and thence to the Mississippi and the port of New Orleans, a distance of almost two thousand miles, and from New Orleans can be again shipped round the circuitous course of the Gulf of Mexico and the Atlantic Ocean to England, a distance altogether of eight thousand miles, and at an expense of about 5*l.* per ton, with a voyage of about four months, and a consequent loss of interest of money

upon so valuable a crop, then it is clear that the tobacco which could be carried in three days, and at a cost of 15*s.* per ton from a farm-house in Clare to the warehouse of the merchant in Liverpool, could be sold at a price which, climate, soil, and expense of labour being equal, could have given the whole of the supplies of the English market to the Irish cultivator in preference to the grower in Virgina or Kentucky. The soils of Ireland are similar to the best tobacco lands of the New World, being formed of long accumulations of vegetable matter, and able, in some portions of the centre of Ireland, to produce more than twenty crops in succession, with judicious cultivation. Then labour is fifty per cent. cheaper in Ireland than in America; for whether the planter shall hire his slaves at the rate of 20*l.* per annum for the time, and about a similar additional sum for the clothing, food, and superintendance of an able-bodied negro, or whether he be the owner of his slaves and subject to the loss of interest upon their value, and the additional losses which all slave-holders sustain from waste, idleness, and theft, it is clear that 1*s.* per day to free labourers in Ireland is cheaper by fifty per cent. than the average slave labour of the American States. The soil and the expense of cultivation being, therefore, in favour of the Irish grower of tobacco, the climate alone remains to be considered. That the plant will ripen regularly in

Ireland is proved, first, by the very act of the suppression of its growth; nor is tobacco a plant which requires any very extraordinary temperature for its cultivation. Of all the British islands, Ireland has, by many degrees, the highest mean annual heat, being warmer in winter though somewhat cooler in summer than its parallel latitudes in England or Wales. The mildness of the climate has long compensated for the deficiency of fuel and of food to the Irish population, has carried them through ages of poverty without the slightest diminution of the stature of the great mass of the people, and is, indeed, the paramount blessing which Ireland enjoys. This is owing to its situation far in the Atlantic Ocean, and its being sheltered by Scotland from the north-east wind, that destroyer of the spring and mortal foe to all vegetable and animated life. The east wind is, indeed, the curse of the climate of the eastern portion of these islands, and neither in Scotland, Wales, nor, indeed, in three quarters of England itself, is there in reality any such season as the spring. But the north-east wind is not only barred out of Ireland by the intervention of Scotland, but in its further passage over the Irish channel it takes up a moisture and warmth with which the air of that sea is more impregnated than the air of the German Ocean, and it is the deficiency of moisture in this wind, as experienced in Scotland and England, which causes its very highly de-

leterious influence upon all vegetable and animated life. Ireland has an earlier summer than any other portion of these islands, and the mean annual heat is also very rapidly increasing with the increasing prevalence and warmth of the south-west wind through the opening of the forests of America, which has caused the extraordinary changes of the seasons which have been witnessed over all these islands in recent years. This effect will also continue annually to be increased by the continued extension of cultivation through the increasing population of the Canadas, Newfoundland, and the United States, by the draining of the bogs, and the embankment of the rivers of Ireland itself, by the conversion into tillage of many millions of acres of grazing land, by the cultivation of the mountains, and by the absorption of the moisture of the air by the limestone which is the manure with which Ireland almost universally abounds. For the lower temperature of the summer of Ireland is owing to the presence of the moisture derived from the exhalations of its many millions of bogs at that season of the year. In the centre of Ireland there are three millions of acres of bogs almost in one uninterrupted mass. The true cause of these bogs being not yet drained is not the disordered condition of the country, but the low price of the production of the soil, which renders the draining of the bogs and the tillage of the mountains not worthy of

the expense, and thus we perceive the evil effects of the prohibition of the cultivation of so valuable a crop as that of tobacco, which the soil, climate, and cheapness of labour, here would have allowed to be so profitably grown. Had not this branch of cultivation been prohibited, the plant would very rapidly have been seen to be the most productive crop that the farmer could have grown, and thus its cultivation would have extended in a few years over hundreds of thousands of acres of land in the southern and the western counties of Ireland. This would have broken up the fertile soils now devoted to pasture, and thus employment would have been found for thousands of the labourers who now are starving in Ireland, or driving the English labourers to the workhouse and the hulks. For tobacco is a crop which requires more labour than all others, and is valuable in proportion to the care which is bestowed upon its cultivation. In trenching, transplanting, weeding, gathering, drying, packing, carting, and shipping this crop, great sources of employment would arise and these all suited to the habits of the people of Ireland, who excel in cultivation by the spade. Then the land of the central counties of Ireland producing three times more valuable crops than those of grass, potatoes, or grain would have risen to three times its former value, and with the increasing value of estates, more capital would have passed into the hands of the pro-

prietors for the redemption of encumbrances and the spread of drainage and tillage to the surrounding lands. The best lands being devoted to the cultivation of tobacco, the inferior soils would have been continued in pasture or broken up for the growth of the corn which then would be raised in price by the consumption of the population engaged in the cultivation of tobacco, and thence tillage would have been pushed up the mountains and over the bogs to the very rapid redemption of all the millions of acres which are now lying in a state of waste. For if the soil, climate, and expense of cultivation are equal in Ireland to the same requisites for the cultivation of the plant in the United States, and 5*l.* per ton, or twenty-five per cent. should be saved by the Irish grower in consequence of the contiguity of his market, it is apparent that Ireland would rapidly have become the great tobacco field of all the European states. If, therefore, three hundred thousand hogsheads of tobacco could be annually exported from Ireland to England, Holland, Hamburgh, Russia, and the German States, by removing the prohibition upon the cultivation of tobacco in Ireland, we should turn the wealth into the hands of our neighbours in that country which now, by this erroneous policy we force into the hands of the people of the United States, to whom, even upon the the principle of universal benevolence, the growth of tobacco is not a material con-

sideration, since the same land and climate would grow cotton, Indian corn, or other of the more valuable crops. Therefore, it appears that by taking off this prohibition of the growth of tobacco in Ireland, without injuring any other nation, we should lower the value of that luxury by about twenty-five per cent. to the people of these islands and of Europe generally, by the difference of transport from Ireland as from America, and this by increasing the consumption would still further extend its cultivation, adding thus to the wealth of Ireland, and the revenue of England, and spreading employment and content amongst a now disaffected population. When it is remembered that the cotton plant which now covers so many millions of acres of land in the United States, was almost unknown within a period of about fifty years, it is not difficult to suppose that five hundred thousand acres of land, in Ireland, shall be covered with plantations of tobacco in the next fifty years.

If it be reasoned that land ought not to be devoted to the cultivation of a luxurious weed, in a country which contains millions of Irishmen without a sufficiency of the commonest food, the shortsightedness of this view of the question will immediately be shewn. For if Ireland, with the produce of one acre of tobacco can purchase in the Baltic States the produce of three acres of corn, it is apparent that three times the food will be in reality the result of the cultivation of tobacco. If

the whole of Ireland were covered with tobacco, and a market existed for its sale, the wealth of the country would be increased by the entire cessation of the growth of corn, of which there is abundance in Holland, Germany, and Russia; and Ireland cannot be in want of food in exchange for its tobacco. The southern states of America grow neither corn, nor animal food, but still purchase abundance of those supplies from the states of Massachusetts and New York, which, having a climate which only will produce corn and the commoner crops, are compelled to carry their exports to the three times more wealthy planters of cotton and tobacco in the southern states. So Ireland, by the exportation of tobacco, a crop which the icy springs of the Northern European nations will not enable them to produce, could be not only abundantly supplied with food, but would bring back a very extensive surplus of wealth by so favourable an exchange.

That tobacco is an exhausting crop, is certainly very true, but this is the reason of the superior value of the plant; and as the soils of Ireland are of such fertility as to be capable of producing it, and thus to earn the reward of such fertility, it is a direct waste of the resources of the country to force such lands to be confined to the grazing of bullocks, which could be three times more profitably employed. If tobacco had been found too exhausting for a profitable crop, the

self-interest of the grower would have caused that disadvantage to be discovered without the interference of the government to direct him in the management of his farm; and it is a tyrannical invasion of all right of property, and a virtual confiscation of a portion of the soil, to lower its value, by prohibiting the cultivators of Ireland from growing what they will upon their own land.

If the protection of the shipping interest, as it is called, was the object of this prohibition of the growth of tobacco in Ireland, it is answered that no tobacco whatever is imported in English bottoms, and therefore our policy has directly found employment for the ships of the United States which carry all the tobacco from America to the European states. Not that this should have any weight for the removal of the prohibition, for if the Americans can convey our supplies at a cheaper rate than we can carry them ourselves, let us gratefully accept their services as carriers, since a profit is left us by their ability to travel across the sea at a cheaper and a swifter rate.

With regard to the employment of our own seamen, it is to be borne in mind, that when railways become generally introduced, the fisheries will become of ten-fold extent, by the rapid and cheap carriage of fish, to the inland districts of the kingdom, thus creating new fields of employment for the maritime population of the country. If the seamen perforce are to be employed, it

would certainly be more profitable for Parliament to vote a million or two yearly for the purpose of sending the merchant vessels to travel about the sea with cargoes of ballast stones, than that Ireland should be debarred from adding ten times this number of millions annually to its capital, in order that tobacco may be needlessly conveyed from a distance of five thousand miles.

It being probable that thoughts for the revenue were the principal inducement to this most unfortunate prohibition, let us, then, examine it in a financial point of view.

First, there would have been no more difficulty in collecting the duty upon tobacco than the duty upon hops; or a composition for the duty in money might have been made with the farmer according to the known degree of the fertility of his land.

Then the illicit distillation of whiskey would have ceased through the rise in the value of grain occasioned by the increased consumption of the population then engaged in the cultivation of tobacco. At the present time the low price of corn, by reason of the distance from the market of England, occasions quantities of grain to be consumed in the private distillation of whiskey, the system being universally encouraged by landholders, farmers, and all other classes of the community as the only mode of making a market for their grain. But when corn should be raised

to a double price, and preserved by means of cheap conveyance upon railways, and the supplies required for the cultivators of tobacco, always upon a level with the prices in England, the whole system of illicit distillation would be naturally abolished by the rise in the value of grain. In England no whiskey is distilled from the cheaper species of grain, because it can be sold for a remunerating price, nor in Ireland would grain be converted into spirits which then could be profitably sold for solid food. The increase of the morality and tranquillity in the country, and the consequent tendency to the diminution of expenditure for troops, police, and the machinery of justice, through the cessation of the supplies of brutalizing whiskey, are all to be considered in relation to their effect upon the revenue of the country; for the consumption of tobacco would have been increased by its cheapness, its sedative influence being also substituted for the exciting influence of spirits upon a population which derives from the nature of the climate of Ireland so great an excess of Italian vehemence and fire. If it was said by Henry the Fourth of France, that he should die with satisfaction when he had seen a fowl in the pot of every peasant in his dominions, let our legislators now follow the sentiment of that illustrious prince, and be assured that soldiers will no longer be required when employment and wages shall be found for the population of Ireland, and

when each of the Terries shall be governed by the milder influence of a cheap, conciliatory pipe.

A statesman is described by the author of "The Wealth of Nations," as a cunning and mischievous animal which is ever on the search for prey; and those whose ravenousness for revenue could cause the burning of eight hundred thousand pounds of the tobacco of Ireland, would seem certainly to possess the true characteristics of the beasts of the field.

This unfortunate policy is here dwelt upon more largely, because the commencement of the growth of tobacco was an evident effort of the stamina of Ireland to raise that country from prostration, and to acquire a superior standing amongst the nations of the world.

For other improvements would rapidly have followed this first introduction of the wedge. The wealth which the cultivation of tobacco would have caused to be accumulated, in a few years would have led to the improvement of agriculture in various modes. The cultivation of other valuable crops would have followed the introduction of one valuable plant; as Indian corn, the cow-cabbage, the richest of grasses, the beet-root, and even the cotton plant, would flourish in the mild climate of the western coasts; the mulberry-tree, the live-oak, and the pitch-pine, could be cultivated in any quarter of Ireland when the climate shall become less moist through the draining of the

bogs, which would become the result of the increased value of land, by the cultivation of valuable crops. Through the steadiness of the climate, and the warm and nourishing quality of the air of Ireland, the finest of animals will also be produced, when the accumulation of capital, and power of improvement, shall have commenced the removal of the present stagnation of the agriculture of the country. The race-horse, the finest of the English breeds of cattle, sheep, and other animal productions, all would far surpass in Ireland, the same breeds in the more changeable climate of the eastern portions of these islands. That the low temperature of the summers of Ireland is caused by the presence of the undrained lands, is seen in the difference in the quality of the grain now produced in the western and the eastern districts, towards which the exhalations are carried by the prevailing south-west wind. For the oats of Galway, and other counties upon the Atlantic coast, are the most valuable of all that species of grain which is brought to the markets of England; affording a clear proof that it is not the moisture from the sea which lowers the temperature of the summer, and decreases the ripening quality of the air. The improvements in the climate and agriculture of Ireland would appear in reality to know no bounds, for the thermometer here takes so small an annual range, that the draining of the waste lands will cause the climate of Ireland to

be little inferior to that of the Azores, islands so celebrated for their salubrity, through the steady temperature of the air. At Terceira it is known that the thermometer never rises above seventy degrees in the summer, and never falls below fifty degrees in winter; nor ever varies more than two degrees in twenty-four hours at any season of the year. And though this is not an extraordinary mean annual heat, yet all vegetable life exists in the most luxuriant profusion in those islands where no violent changes of temperature occur to suspend its development; the human frame attaining also its utmost perfection of shape, and utmost period of longevity, in an atmosphere where the blood is never interrupted in its course. The climate of Ireland is already little inferior to that of the Azores in its temperature, and with the extension of tillage it is probable that frost and snow would become altogether unknown upon the northern and the western coasts. This advantage England, Scotland, and Wales, cannot be expected to possess for a long series of time until the levelling of the forests of Norway, Russia, and the Baltic States, shall let in the sun upon the thousands of millions of acres of forests now lying in a state of shade. The dryness and insalubrity of the north-east wind is derived from its passing over those northern wastes, where neither warmth, nor the due proportion of moisture which is derived from evaporation, can

exist, whilst the sun is excluded from depositing its influence in the earth. Ireland, from its western position, and consequent freedom from the shocks which are given to vegetation by the influence of the north-east wind is destined to become the garden of these islands, and Goldsmith has described the climate of his native country without much poetic exaggeration in the celebrated lines :—

> " Where smiling spring its earliest visit paid,
> And parting summer's lingering blooms delayed."

CHAPTER XVII.

Influence of railways upon the Irish mines—A railroad proposed from Kilkenny to the Irish Channel—The Kilkenny coal field reached by this line—The coal described—Its advantages for steam navigation—Probability of an extensive export trade in coal—This fuel favourable for the smelting of ores—When conveyed upon railways will cause the re-opening of the Irish mines—The hot blast and its effects in the manufacture of iron—Anthracite may be cheapened in its excavation—Ireland may now become possessed of extensive manufactures of iron.

The new system of roads may next be considered with reference to its influence upon the revival of the Irish mines.

With this view a line of railway should be carried from Kilkenny to Waterford, and at a future time to the proposed new harbour upon Dungarvon Bay.

This railroad would not only open out the cheapest mode of transmission for the agricultural produce of Kilkenny and the neighbouring counties, to the markets of England and Wales, but will cause new operations in the coal, which abounds over all that portion of Ireland. This coal is of the kind called anthracite; it is an almost pure carbonaceous substance, is devoid of hydrogen, lies near to the surface, and is invari-

ably found upon the primitive rocks. The great solidity and hardness of the texture of this mineral renders its excavation a work of three times greater expense than the mining of the bituminous coal of England and Wales; to which cause, with its deficiency of hydrogen, and therefore of flame, and consequent injurious effect upon the boilers of steam-engines, is to be attributed its having not become so important an article of trade which coal in the centre of Ireland might be supposed to create. The superabundance of carbonic acid gas, a fluid most prejudicial to the human lungs, has also rendered it not very desirable for purposes of domestic use, and therefore the coal fields of Kilkenny and the surrounding counties have been little worked for other purposes than malting, iron foundries, and other operations for which flame is not required.

The introduction of railroads now renders it, however, an object of importance to examine whether there be not prospects of employing this coal in a very extensive branch of trade, as fuel for the purposes of steam navigation.

Owing to the greater specific gravity of anthracite coal, there would be a saving of more than one half of the room now required for fuel in the shape of the English bituminous coal. In the passage from England to the United States, the fuel for a steam ship of one hundred and twenty horse power, for sixteen days, would amount to more than three

hundred and twenty tons of bituminous coal; whereas less than one hundred and fifty tons of anthracite would create an equal amount of fire; and it therefore follows that one hundred and fifty tons of space would be saved for the carrying of merchandise; and that if the anthracite of Kilkenny could be conveyed to Dungarvon, and there sold at 1*l.* 5*s.* per ton, it would still be immeasurably cheaper for fuel in steam-navigation, even with the expense occasioned by its greater oxydation of the iron of the boiler, than any English coal. This fuel being thus so much more desirable for the purposes of steam navigation than any other which is known, and no extensive beds of it existing in England, Scotland, or Wales, it is probable that steam vessels departing across the ocean would call for their fuel at Dungarvon, Cork, Youhall, or other harbours contiguous to this great field of coal. As the harbour which is proposed to be formed at Dungarvon Bay would be the most accessible, and secure, it is probable that the coal trade of Ireland would centre at that port.

Allowing, then, that fuel for a voyage to New York could be provided at 1*l.* 5*s.* per ton, and that one-half of the space now required for the coal were saved for the stowage of merchandise, at 3*l.* or even 4*l.* per ton, which the more rapid passage and saving of interest of money upon the voyage would cause to be afforded for the freight; it is

apparent that the bringing into use of the coal of Kilkenny would become the source of an extensive trade in that description of fuel, and would also overcome the only remaining obstacle to the navigation of the ocean by steam.

For steam navigation to the United States there is the double advantage in the abundance of anthracite in that country for the supply of fuel upon the voyage home. The great anthracite field of Pennsylvania is at a place called Carbondale, upon the Shulkyll river, where more than forty thousand tons of this mineral have in some years been raised for the supply of Philadelphia, New York, Boston, and other American cities, and even partially for exportation to France, Germany, and Holland. This material is of a better quality than that of the Irish field,* for it contains of hydrogen from two to five per cent., and is found in much deeper veins. Estimating its price to be the same as at an Irish port, we have then the fuel of steam shipping for the whole of the voyage, outward and homeward, from the ports of America to Great Britain, contained in one half the present space. What effect this may have upon giving impetus to that most desirable mode of shortening the voyage between the continents of

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* According to the experiments of my friend, Dr. Samuel L. Medcalf, of New York.

Europe and America, is a matter most worthy of examination, not more for the benefit of Ireland, through the extensive supplies of coal that would be required, than for its commercial and political influence both upon the old and the new world.

Not only, indeed, would supplies of anthracite be at hand for sale to steam shipping which should call at the Irish ports upon the outward voyage, but a great export trade would also be created to France, Hamburg, Holland, and others of the European states. The enormous blocks in which this coal can be procured, with the advantage in its greater specific gravity, renders it capable of being freighted at a considerably cheaper rate than any bituminous coal. For English coals are so light a cargo that the expense of exporting Kilkenny coal would be at least one third less for a similar distance than that of any of the English, Welsh, or Scotch bituminous coals.

Again, the cheap conveyance of this coal upon railways will have a most extensive effect in causing the re-opening of the mines of iron ore, copper and lead, with which Ireland is so abundantly stored. Its deficiency of flame is not an injurious quality in the smelting of ores; and the cheap carriage of those substances, and of lime which also abounds and is indispensable in the manufacture of iron, will now enable the Irish

mines to be most profitably re-worked. They have all been gradually abandoned through the destruction of the woods and absence of a substitute in coal; for even the copper mines of Killarney could only be worked by coals imported for the steam power from Swansea at a cost of 2*l.* per ton, and thence the decline and abandonment of those valuable mines. But now the economy of fuel in manufactures is rapidly becoming better understood; as the hot-blast, which has been introduced within the last four years into the iron manufactories of Scotland, has had the extraordinary effect of reducing the quantity of fuel to one quarter of the former amount required—two tons and a half of coal, or a corresponding quantity of coke, being at this time sufficient for the smelting of one ton of iron, though for the same process about eight tons of the same quality of fuel was formerly required.

By introducing this system of smelting into Ireland, the expense of the anthracite required in the manufacture of iron would be reduced to one quarter of the present cost, and only one quarter of the weight being required to be carried to the iron mines, and lime generally abounding in the vicinity of the ores, this conjunction of new circumstances, with the cheap transit of the manufactured iron upon the railways for exportation, may lead to a most extensive resumption of the operations at the Irish mines. The quantity of

coal required in smelting being now reduced to one quarter of its former weight, that ingredient in the manufacture of iron will become less overwhelming in its importance, and be outweighed by the cheapness of the ores and the lime. Anthracite coal, though not equal to the charcoal from wood in imparting malleability to the metal, is much superior to it in the manufacture of cast iron, and being much cheaper in expense than the coke which is used in England and Wales, there remains no reason why Ireland, under the new system of roads, should not take to itself a very extensive portion of the iron manufactures of the world

Perhaps, also, the expense of raising this coal may become extensively diminished ; for it usually lies so near to the surface, that the whole superincumbent strata might be removed at a small expense by tramways; the soil becoming an article of sale in the new order of things in agriculture, through the introduction of iron roads. The stratum of coal could be then worked as a quarry, and the blocks sawn into the best shapes for stowage, for the purposes of steam navigation. Under this system the expense of the excavation of anthracite may become even less than that occasioned by the raising of bituminous coal, in consequence of the extraordinary depth of many of the best English mines.

Thus will the new system of transport produce

openings upon all hands for Irish labour, enterprise, and skill. The soil, the sea, the mines, all will be brought into subjection to the capital which will then accumulate with compound rapidity in each succeeding year.

CHAPTER XVIII.

English railways as connected with the Irish trade—Line from Bristol to London—New harbour upon the Bristol Channel proposed—Railway from Birmingham to Bristol proposed—Great importance of such a line—The port of Liverpool as connected with the Irish trade—Injustice of the high dock dues—Proposal for deepening the Menai Strait—The English manufacturing districts interested in the cheap supplies of Irish grain—The general interests of the two countries the same.

Other views for the facilitating of the intercourse between Ireland and England present themselves next, in conjunction with the railroads and harbours upon the English side.

First, the whole trade of the south of Ireland has a tendency, from geographical position, to centre at the port of Bristol, and the merchandise to be conveyed to London by land upon the railways to be formed. But upon the scale upon which the Great Western railway has commenced its operations, this object of conveying to the metropolitan market the corn, cattle, and potatoes of Ireland is not even proposed to be accomplished. For this railroad professes to depend for its revenue upon passengers alone; and it is apparent that a line, which has commenced its operations with preliminary mill-stones of so enormous a weight

about its neck, never can convey the cheap agricultural productions of Ireland, at that farthing per ton mile which is required as the true rate of toll. To convey Irish passengers at a rapid and agreeable rate from Bristol to London, is certainly an advantage to those who visit us for purposes of pleasure; but the amount of gain to the commercial part of the travellers upon such a railroad would not be very extensive, if the cargoes, which they are supposed to come to England to sell, are not carried upon the railway simultaneously with themselves, but in the act of being beaten round to the Thames, and therefore detained sometimes a month upon the sea. Consequently some road must be found which shall be enabled to act at the minimum of expense, and the turnpike road from the metropolis to Bristol will naturally be made the foundation of the line.

There is, however, no reason why this line should be carried to the city of Bristol itself, otherwise than by a branch. That port is dear—difficult and tedious of access—and a new harbour upon the Bristol Channel, due west from the metropolis, may become most requisite to be formed.

To this new port upon the Bristol Channel a number of other great lines would be brought.

From Birmingham to such a new place of shipment would be a distance of about ninety miles. Here, upon a railway, the whole exports of Bir-

mingham to the south of Ireland, and indeed to the United States, West Indies, South America, and all other countries to the west, would be conveyed in one day, and at a cost of not more than 7*s.* 6*d.* per ton, even at the rate of 1*d.* per ton, per mile. At the present time we have seen that the very cost of canal transport, from Birmingham to London alone, is never less than 2*l.* 15*s.* per ton, exclusive of all the succeeding expenses of the Thames. Thence the export trade of that great manufacturing town and district will divide itself into two wide streams, one from Dover to the European states, and the other to the western nations at the Bristol Channel. The potteries of Staffordshire, and the iron manufactures of Wales, with the woollen manufactures of the west of England, all at this port will find their outlet to the western world. Then the imports of grain, cattle, and potatoes from the south of Ireland, with all the colonial imports of those great seats of our staple manufactures, will be conveyed at a similarly low rate upon the line. Thence this new railroad and harbour will become of the greatest possible importance both for the Irish and the English trade.

The people of Ireland are also interested in the most economical entrance to the Liverpool Docks. One-half of the revenue from these docks is derived from the Irish trade, whether through the direct dues upon the importations of Irish corn, cattle, and other productions, or indirectly

through the importations of colonial produce with which Ireland is again so extensively supplied from that port, and all of which must be raised in price to the Irish consumer by the amount of dock dues which the importer may have paid. Upon the legislative principles of corporations, which bodies are supposed to be endowed with their privileges for the protection of trade, the dues at all harbours and docks should be maintained at the minimum required for their construction, management, and repair. The appropriation of the revenue derived from the Liverpool Docks to the purposes of the police, churches, and other civic expenses of the town, is most unjust towards the Irish traders who thus support, in a very extensive degree, the establishments of an English town. Either, therefore, the dock dues of Liverpool should be reduced to the lowest practicable rate, or the revenues be appropriated to the exclusive improvement of the harbour, or to the improvement of the harbours of Ireland itself, or other public purposes in which both countries have a reciprocity of advantage in the expenditure of those great annual sums. The true principle, however, would seem to point to the abolition of all corporate rights, and the sale of the docks to private individuals, or private companies, and the consequent introduction of the cheapest management, and greatest reduction of toll, which the competition of numerous proprietors of individual docks would

create. The utmost benefit would by this change be conferred upon the commerce of both England and Ireland, and the surplus revenue would remain, where the French statesman so justly declared that it ought to remain, in the pockets of the people. In the new order of things at Liverpool, it is indeed supposed that the present possessors of municipal power will search for the just principles of commerce, and have no wish to be filled up to vomiting with undue Irish wealth.

For the beneficial employment of such revenues for the present, it may be worthy to point to the improvement of the navigation of the Menai Strait. Could the navigation of this strait be effectually opened, then a direct line of passage up the channel would exist, not only from the south of Ireland, but from all quarters of the western world. This would cut off a circuit of about one hundred miles round the entire island of Anglesea, which is a very dangerous lee shore. Not only would the rate of insurance be reduced, but the expense of a navigation of one hundred miles, from the harbours of the south of Ireland, and a corresponding diminution of the cost of conveying merchandise and passengers across the channel would be saved by passing through the strait. Were one or two millions of money expended upon the deepening this channel to about six fathoms of water, a very minute toll would repay this outlay, so great would be the number of vessels which then would pass through the strait.

The interests and rights of the people of Ireland and of England are one, individual, and the same. The manufacturers of Manchester are interested in obtaining the cheap entrance of Irish grain, cattle, and potatoes, into the harbour of Liverpool, because thence results cheap markets for food, cheap wages to workmen, and therefore a more extended foreign trade. The Irish corn grower can also purchase an extended quantity of English goods, when freed from an undue intermediate mulcting of his prices by the corporate proprietors of docks, and when the expenditure of revenue shall be directed to the cutting off the difficulty, danger, and time, of his arriving with his cargo at an English port. Neither could that quarter of England obtain its requisite supplies of provisions so cheaply from abroad, an advantage which must certainly be pointed out and allowed in casting up the balance of national statistics with our Irish friends.

CHAPTER XIX.

Some of the present political questions of Ireland discussed—Church reform—Poor rates—Public education—Public works—The fisheries—Draining of the bogs—Taxes upon absentees—All these exaggerated in their importance—Ireland is possessed of abundant resources without assistance from the state.

To establish fully these views and to prove that the grievances usually complained of by the people of Ireland, have not so paramount an influence upon their condition as is usually supposed, and may be all overcome by the means of acquiring wealth, which the advances of science are so rapidly opening out, it is purposed to conclude this review of the affairs of that country with some remarks upon the principal questions of the day,—reform of the church—poor rates—education—public works—draining of the bogs—public fisheries—taxes upon absentees, and other propositions of the Irish politicians, engineers, and people at large.

First, with regard to the property of the church. All the maxims of the political writers, point to the expediency of following the religious prejudices of the people of conquered states; for this sentiment occasions whole ages of opposition to the invading power, and never can be removed by military

force. The attempts to maintain a foreign church in so populous a country as Ireland are attended with an expense for police, troops, legal proceedings, and the cessation from labour which the combinations against the system create, probably greater than though the clergy were triply paid out from the general revenues of the state.

But still, it is not probable that the transfer of the property of the church would have any substantial influence upon the prosperity of Ireland, beyond the beneficial results which would result from the assuagement of the national mind. The productions of the soil now owned by the church would remain the same, and the same aggregate amount of employment would exist for the mass of the people. Alterations in the tenures of church property are certainly required, for considerable impediments to the improvement of the agriculture of Ireland are produced by those ancient modes, but to those changes it is probable that the factions would not object.

With regard to poor laws for Ireland, that also is of very questionable utility indeed. We have seen that the great source of the poverty of the people is occasioned by the absence of tillage, through the low prices of agricultural produce by reason of the expense of its transmission to the English side. It therefore would be a cruelty to compel the owners of the property of Ireland to support the poor whom their own disadvantageous cir-

cumstances will not enable them to employ; and compulsory support of the poor would soon make property valueless in the average of Ireland, and by impeding improvement would magnify the evil it was intended to prevent. An Irish landlord does not obtain more than one half of the rental of his land, though the contrary is usually supposed, which is obtained by the landowner in England for property of a similar quality and value in point of situation. Estimating the larger quantity of land contained in the Irish acre, and the smaller amount of money in which Irish rent usually is paid, it will certainly be found that, notwithstanding the pressure of the population upon the soil, the average rental of land is not more than one half of the rent paid for lands of similar fertility in England, or even in Scotland or Wales. Whole counties of land in the west of Ireland do not average a rental of 10*s.* per acre, and yet those are the spots where, by reason of the absence of tillage, the distressed population is seen principally to abound, and thus the evil is greatest where the means for its prevention are unfortunately the least. To give compulsory relief to the whole of the unemployed population of Ireland, is to allow more than one half of their numbers to consume the produce of the labour of the remainder which in the whole of the western counties would cause the entire abandonment of the soil.

And passing to the farthest argument in favour

of the system of poor laws, that each man has a right to a subsistence in the locality of his birth, and though all property should be at an end, yet that human beings are not to be found dead upon the roads whilst there is anything remaining to be seized upon by force, yet even the allowance of this right would be found to add more to the accumulations of misery that already are too great. For, if property were abandoned to the surrounding population, the paupers would be devoid of all means of cultivating the soil; since it is perfectly well known that the absence of accumulation, and the consequent pressure of the instantaneous hunger of the cotter, forces him upon the average of the small holdings to dig his potatoes unripe, and one third portion of the crops of the western counties is estimated to be thus annually lost. Therefore, the absence of capital, and inability to wait for the crop, would gradually cause even the holding which had been abandoned to the peasant, to be by him in turn abandoned to the weeds. All this routine has occurred in the agricultural parishes of England, and it would occur with much greater rapidity in Ireland, where the unemployed multitudes are so much more great. It is, moreover, to be doubted, that the claims of the distressed are really just against the individual possessors of property, in the neighbourhood of whose estates they may have happened to have been born, for this is throwing the whole burthen upon individuals, who are not

more interested than others in the preservation of the peace of society, for which poor laws are supposed to be passed. If poor laws be required, a general rate would equalize the burthen, whilst parochial systems operate only where the distress is the greater, by the greater distress of the employers of labour themselves; and this leads to an exception of the rich, and a seizure of the property of the nearer and the poorer possessor of the soil. It is certain, moreover, that no poor rates will be required in Ireland, after governments have become more enlightened to the truth that they themselves, by placing shackles upon the labour of the people, are the grand originators of all our distress. Thus the abolition of the corn laws of England, by allowing the manufactures to expand, would drain away a large portion of the unemployed Irish population, and probably the manufactories of England would regularly absorb them all. It is, therefore, more in accordance with the principle of benevolence, that Ireland should not adopt the system of compulsory relief, but wait rather for the progress of commercial liberty, and the consequent opening out of the English fields of employment for the Irish poor. The Irish are laborious, vigorous, humble, grateful, and enthusiastic in fidelity where confidence is reposed; and it is employment that such a population is in search of, and not mere charitable bread.

Education, again, in the famishing of great

multitudes of the people, is not a correct mode of applying the surplus of the revenues of the church. Education, no more than shoes or potatoes, ought to be conferred upon the people by the state. Like poor laws, general systems of education tend to teach people to depend for that upon others which employment and good wages would much better enable them to procure for themselves. General systems of charity are entirely the result of erroneous or tyrannical legislation; for were there real liberty in the world, the fields of production are so boundless, that the poor would be limited to the aged and the sick, the means of whose support would be so superabundant, that no compulsory rate would be required. Would governments but stand out of the way of the industry of the people, remove the fetters upon our commerce, and allow a really free trade in corn, money, and all other commodities—then poverty, and with it, workhouses, gaols, hulks, and scaffolds, all soon would disappear, and be heard of no more.

The proposed tax upon absentees would also be impolitic and unjust. To fine individuals for residing where they will, is contrary to the common right of locomotion which every subject should possess; whether for the pursuits of commerce, or of that pleasure of travel, which he has previously toiled to enjoy. Through such a restriction as this the possessors of the soil would

become a poorer and, therefore, less efficacious race of cultivators, for no purchaser who could obtain landed property in England, or in Belgium, or France, would purchase it in Ireland, when subject to a fine or to be made a prisoner upon it. Moreover, the evils of absenteeism have been greatly exaggerated, for the non-resident landlord would have only consumed in Ireland the provisions for his family, corn for his coach-horses, and other supplies to which rent is devoted, which he consumes equally in England, after the transmission of these supplies from Ireland, by the corn merchant, who purchased them from the tenant, and paid for them in the money which that tenant then transmitted to the landlord at London, Cheltenham, or Bath. Unless it be proved that the landlord upon his Irish estate pays more for his corn than the corn merchant in the neighbouring town, it is not material to the payer of rent to which of these parties the grain shall be sold. Then the rent of the landlord would have been only partially consumed in Ireland, though he were resident upon his estate, for a considerable portion of the amount would still be compulsorily sent over to England, either directly or indirectly, for the purchase of clothing for his family, liveries for his servants, and the many other manufactured commodities in which money must be spent. The mere supplies of provisions consumed by the whole of the non-resident landlords, would pro-

bably not much increase the prices of grain, for it is the absence of the millions and not of the few, the absence of the steam engine and not of the landlords, which causes the low prices of Irish corn. Even if this landlord should reside in Italy, Belgium, or France, yet there he would consume the agricultural productions which have been raised by labourers who wear English clothing and use English tools, and the English makers of those clothing and tools have consumed the Irish grain, in which the rent of this landlord was originally paid. With regard to the effect of absenteeism upon the improvement of the country, it may also be doubted whether landlords, whose patriotism is not now sufficient to draw from the pleasures of London or Rome, would be more disposed to cultivate estates, or to be of any other utility to their country at home. Nor is it sufficiently borne in mind that great numbers of English and foreign visiters annually travel into Ireland; these increasing in numbers and the consequent expenditure of money, through the increasing facilities of steam navigation—or that the Irish labourers also take back a great aggregate amount of the money of England saved from their wages in harvest time. Altogether, the evils of absenteeism have been much exaggerated, for the poverty of Ireland arising from other causes, has fixed the attention of the people upon a subject which in England, a country which parts annually with

twenty times more capital through an aristocracy absent abroad, never is a subject of the slightest consideration amongst those who are accustomed to investigate the sources of the national wealth.

Public works are called for by the Irish engineers ; although the history of the previous public works in canals, harbours, and fishing stations, is one uninterrupted history of corruption, unparalleled in the history of any civilized land. From the time when Mr. Arthur Young could not conceal his indignation at the state of the public works, to the period when 70,000*l.* has been lent to a railroad which never has carried one ton of potatoes upon its line, all has been one vast inroad upon plain commercial law. And yet more millions are now loudly demanded for the draining of bogs, making of roads, and erection of fishing stations upon the western coast. But all this new expenditure would follow into the tomb of the millions that have gone before; since it is useless to drain bogs at a cost three times greater than the value of land ready drained in Belgium, or France, and from which the agricultural supplies could therefore be obtained at a cheaper rate. But when the prices of produce, shall be raised in Ireland to a rate at which land may be obtained from the bogs will repay the expenses of its reclamation, then the self interest of individual proprietors will cause that expenditure to be made without the assistance of the

state. Nor is it required to grant money for the formation of roads until there is the semblance of a trade, for trade will usually make roads, but roads will not always make a trade. And when the fish taken upon the western coast can be sold at an increased price through the speed and economy of railway transport to the markets of Ireland and England, or when the surplus of fish can be cured with salt brought from Cheshire, at 12*s.* per ton, instead of 2*l.* 2*s.* per ton at the present time, or with salt manufactured from sea-water with Kilkenny coal, to be carried at a small toll upon the railways, then the declining fisheries will be invigorated without the aid of the useless crutches which are now sought to be borrowed from the state. Open really the fields of wealth, and individual capitalists will build fishing piers, and effect the draining of bogs more effectually than those operations can be accomplished by public boards, of which the component members feast sumptuously every day. There is no want of individual capitalists in Ireland where there is a really profitable investment to be found, and when such openings shall be seen, then the English capital which travels for investment to the farthest corner of the world, would prefer the nearest field of occupation, and be carried into Ireland upon the wings of the wind.

The people of Ireland should, therefore, call no longer upon the heavens and the earth for pity

upon the sorrows which they declare have been occasioned only by our English misrule. For there is no error in legislation which does not fall upon England in an equal share of injurious consequences, and yet English science has overcome all the follies of a government, which certainly does exist for little else than to mar the industrious efforts of the great mass of the people. But, better prospects are now arising upon both nations; principles are now becoming better understood, and this will lead to the removal of many monopolies, and of much erroneous undoubtedly, but not intentionally tyrannical, law. Labour will not now remain much longer in its chains, and the people of Ireland would be more benefited by the cessation of their feelings of political alienation from England, whose better days they may now have an opportunity to share by following her fortunes to the end.

CHAPTER XX.

The railway system in the new world—Railways from Halifax to Boston, and round the whole circuit of the sea board of the United States—Line from Quebec to the Bay of Fundy—The St. Lawrence superseded—Railway across the peninsula of Florida—Importance of this work—Line from Baltimore to the Ohio river.

From Ireland the transition is not unnatural to the busy cities and roads of the New World.

Here, the influence of railroads will probably be greater than in any of the European States. Already we have seen that England is the great mart for all the agricultural nations; that the corn, cotton, rice and provisions of America, like the corn and the cattle of Ireland, will be raised in price by the facility of reaching these islands by the nearest and the cheapest route; and that this transit may be quickened by the introduction of steam navigation through the use of Irish anthracite coal, and of American anthracite upon the voyage home. And as the building of steam engines and steam ships is very obviously in its infancy, and steam ships will be driven at double their present rate of speed, before many years have elapsed, we may reasonably now foresee that the Atlantic will be regularly crossed in a

week. The effect of such a change upon the commerce, politics, and pleasures of the people of both hemispheres, it is needless to attempt to describe.

Here, I will boldly point to the circumstance, that the depth of the Atlantic Ocean, between the western coast of Ireland and the coast of Newfoundland, does not carry an average depth of more than about thirty-five fathoms, the distance being twelve hundred miles. In this age, nothing can be presumed to be founded upon such a circumstance in the natural history of the sea, but in anticipation of the wonders of futurity, the shallowness of the ocean between these islands and the continent of America may be worthy of being pointed out.

Arriving, then, at Halifax in Nova Scotia, we see the site of a railway to St. John's in the province of New Brunswick, and thence southward to Boston, New York, and around the whole circuit of the United States. So rapid has been the introduction of railroads in those states, that thirteen seventeenths of the whole circuit of their coasts, from New Orleans to Boston, are now covered, or in the act of being covered with iron roads. And as Europe is the great market for the productions of those states, and Halifax stands one thousand miles nearer to England than does even the central city of New York, it is apparent that a continuation of the railroad line from New York, through Boston and Halifax, would

command the whole stream of passengers, merchandise, and mails, to and from the whole of the American and the European states.

But the principal railroad for the Canadian provinces is the line projected from Quebec, to the harbour of St. Andrews, upon the Bay of Fundy. This line will cut off a navigation of twelve hundred miles down the river St. Lawrence, and convey the whole commerce of the upper regions of that river to the Atlantic in a distance of one hundred and ninety-five miles, to a harbour which is open at all seasons of the year. For the St. Lawrence river affords not only a very circuitous and dangerous navigation, but, for many months in the year, is closed by the ice: the whole foreign commerce of the Canadas being at a stand for those long periods of time. The proposed new road would pass through now almost untrodden forests, and through the heart of the government lands, the increased value of which would repay companies who should undertake to construct this work for a grant of lands of some given extent upon the line. By commencing with a single track, and laying down the framework of timber, which may be obtained upon the line for the mere expense of cutting it down, this railroad may be constructed at an expense of less than 1000*l.* per mile, and the whole cost of the undertaking would undoubtedly be repaid in a single year, when the

whole trade of the St. Lawrence should be carried upon it to the sea.

The construction of these works will effect the most extraordinary change in the Canadian provinces, which then will be peopled, cleared, warmed, and enriched, with a rapidity which will bring them to a level of advantages in climate and agricultural productions with the countries in their parallel latitudes in the southern departments of France.

The population and clearing of the Canadas are objects of the greatest importance, not certainly to England, as colonial possessions, for it is immaterial under what government those provinces may ultimately be ranged ; but through the improvements in the climate, which may be effected in the Canadas, and thence in the United States, and indirectly in England, Ireland, and all the European states. For it is the clearing of the forests of Canada which has produced those extraordinary changes in the seasons, which cause us in Great Britain to fancy that our island has been transported to some southern sea. The levelling of the forests of the continent of America has mitigated the severity of the north-west wind, which blows over the continent of America with the intensity of temperature and deficiency of moisture, which in Europe we experience from the winds which come to us from the Russian regions of the north-east. It is this mitigation of the severity of the

prevailing wind which has diminished the quantity of snow which formerly barricated the inhabitants of Canada in their dwellings for months of the year; which has caused snow in the once wintry state of Virginia to become almost unknown; is causing the St. Lawrence river to close annually later in the autumn, and to open earlier in the spring; and communicates its influence to all these islands, and the whole of the countries which lie open to the warm Atlantic winds. The continued extension of the clearing and draining of the Canadian wastes, will increase these influences in a compound degree, through the increase of emigration, occasioned by steam navigation and of railway transit through the colonies; and thus, in another quarter of a century, the changes in the climate of Canada will be still more extraordinary than those which have been witnessed during recent years.

It is for these reasons that the whole force of our surplus capital and labour should be poured into the Canadas, as the foreign land most contiguous to our shores, and presenting the richest field for the acquisition of future wealth. The labour of convicts should be directed to these provinces in preference to New South Wales; for never, in the history of statistics, was folly so monstrous to be seen, as our sending away convicts, at a cost of 100*l.* per head, over a distance of twelve thousand miles, and to a country in which

their labours can render no benefit to the present state—whereas one twentieth part of that expense would cover the cost of their conveyance to the Canadas, where the operations of clearing, draining, and the construction of roads, would produce an immediate and profitable return. If punishment and isolation be the object of transportation, that purpose could be more easily attained upon the wintry islands of New Brunswick and Newfoundland, than in the temperate and delightful climate of New South Wales, to which so many thousands of our people are seen to emigrate from their own free will. Were the labour of convicts employed only in filling up the countless shallow bays, lakes, and rivers, of the Canadas and Newfoundland, and thus diminishing the surface of the inland waters of those provinces; this employment of their labour would repay its expense in the amelioration of the climate, and the consequent improvement of the agricultural productions of the country, and the general influence of happiness which a genial climate always will create. For it is not sufficiently observed, that the improvement of the climate of a country adds greatly to its wealth through the improved quality and increased quantity of the productions of the soil.

The mitigation of the severity of the north-west wind, is a most desirable object, not only to the people of the Canadian provinces, but equally to the inhabitants of the whole United States.

The violent changes of temperature now experienced in all those states to the north of the Chesapeake, have their origin in the uncleared millions of acres of forest land and in the existence of the cold surfaces of the inland lakes, and the consequent low temperature of the north-west wind. The New England states are subject to the ravages of consumption, arising in the climate of the country from this great defect alone; for the bills of mortality of the city of Philadelphia bear witness that almost one half of its population are carried off by that terrible disease. The thermometer in the city of Albany has been observed to stand at seventy degrees at mid-day in the month of January, and yet with a change in the wind to the north-west, within a period of less than nine hours, has fallen to the freezing point. Such a country, therefore, is not fit to be inhabited by man; and it becomes immaterial to what power the Canadas shall ultimately belong, whilst the winters of the United States are being brought, by the labours of the people, to a temperature of the warm European latitudes, in the parallels of which these provinces are laced. The reciprocal interests of nations are here very plainly seen, for one nation partakes of the victory gained over winter by another; and therefore disputes about boundary lines are reduced into insignificance, when the axe of the emigrant, in clearing the Canadian woods, is warming the wings of the

wind, and levelling the common foe of the new world.

The facilities of railroad transport, and of steam-navigation will, therefore, effect the most extraordinary changes in the Canadas, which, from their position, one thousand miles nearer to Europe than the United States, will become the most valuable portion of the new world, should the climate become so changed as to cause the cultivation of cotton, tobacco, Indian corn, and the other more valuable crops of the countries to the south.

We proceed, then, from Halifax, round the coast of Nova Scotia, in one uninterrupted line of railroads, across the St. Lawrence river, to Boston, New York, Philadelphia, Baltimore, Washington, Richmond, Charleston, Savannah, and across the Peninsula of Florida to the Mississippi river at New Orleans; a line which encircles the whole coast of the United States, connects all its divisions, from the Mexican Gulf to the frontiers of Canada, and is carried over a distance of two thousand miles. Visionary as such a chain of railroads might have appeared within a period of a very few years, it is yet certain that the greater portion of this wide circuit is already under the progress of rapid execution, and that the whole will be completed within the next ten years. Then the traveller shall pass at the rate of five hundred miles per day, from the snows of Maine to the warm wintry sun of the southern states.

But greater advantages will arise from the formation of the railways which now are reaching their giant arms over hundreds of miles towards the rivers and regions of the west. The railroad from Baltimore to the Ohio river at Wheeling, when completed, will turn the whole trade of that great river from its present southern course towards the Gulf of Mexico, to the Atlantic states, a change, the advantages of which will at once be seen. For the course of the western rivers is towards the market of New Orleans, a voyage which occupies a period of a month, through the dangerous navigation of the Mississippi river, for a distance of two thousand miles, and thence by the circuit of the whole Gulf of Mexico to Europe and the Northern States. Therefore, a line of railroad from the Ohio river to the Atlantic Ocean, will cut off a navigation of five thousand miles towards Europe, the Canadas, and the Northern States; and though this line were carried even for a distance of five hundred miles through the states of Kentucky and Tennessee, yet the cotton, tobacco, and Indian corn of those fertile states could be carried at one half of the price, and in one twentieth part of the time, and without any of the hazard, of the navigation of the Mississippi and the Gulf of Mexico, that most dangerous of seas.

In this diversion of the trade of the Western States from the Mississippi to the Atlantic Ocean, great political advantages will also arise. At pre-

sent the people of the West are separated from the Eastern and Northern States by the difference of the channels through which they communicate with the sea.

The rivers of the west flow towards the Mexican Gulf, and thence the population of the rich states beyond the Alleghany mountains frequent markets unconnected with the other divisions of the union, and therefore, little commercial intercourse or community of interest is found to exist. But when the imports and exports of the western states shall be conveyed through the eastern states at a quarter of the cost, and in one twentieth portion of the time now required for the passage round the Mexican Gulf, a connexion between these divisions of the union will be established and confirmed, and the rapidity of intercourse with the more civilized portions of the nation will carry the influence of intelligence across the now Tartarous regions of the west.

CHAPTER XXI.

Other political consequences of railways in the United States —Their effect in concentrating the population—Commerce directed from the western rivers by railways to the Atlantic Ocean—Thence the prevention of emigration to the new States, and spread of agriculture in the New England States—The climate of the New England States considered—Its extreme variableness and low temperature in winter—Proposal for the embankment of the Lakes.

This conjunction of the states, and concentration of the people, is amongst the greatest advantages which the United States will derive from the introduction of the system of iron roads. The more fertile of the lands and the most salubrious climate are found beyond the Alleghany mountains, the population is, therefore, hurrying in masses to the west; the principle of concentration is abandoned, and in the interminable choice of lands all stray like Arabs to the fertile spots—are dispersed —divided—lost. This dispersion of the people is the greatest disadvantage of those wide states, for no improvements take place when men combine not into masses, and when the subdivision of labour cannot be obtained. Were England not an island where the land is all in occupation, and could all become independent proprietors at their

will, then the steam-engine and all the vast power of machinery could never, probably, have been brought into action amongst a people who then could not have been gathered into the mines, the foundries, and the mills. It is the principle of concentration that gives solid power to states. When the railroads shall gather the population into masses, and divert the trade from the distant channels into which it now flows, then this exchange will redouble the value of the simultaneous exertions of the people, and by the concentration of their capital and labour, these states will exhibit to the world the spectacle of a prosperous population, and of a well cemented government and solid power.

Amongst the most remarkable of the railroads already completed in the United States is the line from Charleston to Hamburgh, upon the Savannah river, a distance of one hundred and ninety-five miles. This work has been executed with great ingenuity, and comparatively at a very inconsiderable cost. It consists of a single track, with a turnout at a distance of each quarter of a mile, and is carried over the swampy country by means of charred piles, which give it the appearance of a bridge. The land through which this railroad is carried was given gratuitously by the proprietors for a distance of about ninety miles, and the whole cost of the work has not exceeded the sum of 5,260 dollars, or about 1,300*l.* per mile.

A very low rate of toll is, accordingly, sufficient upon the cotton and other productions which are its staple articles of conveyance, and foreign imports now reach the upland districts at an extensive diminution in expense. Locomotive steam engines are used, although it is evidently an error to place a machine weighing upon an average ten tons, upon a framework resting only upon piles, and therefore not calculated for the bearing of any extraordinary weight. The horse, weighing not a tenth part of a locomotive engine, the use of animal power would be an advantageous change, upon that portion of the line which passes through the swamps. The work is altogether a most valuable one, and well calculated to enrich the southern states.

A line of railroad, from New Orleans to the Atlantic Ocean across the Isthmus of Florida, would produce most extensive results. This distance is one hundred and ninety-five miles, and the railroad would cut off the navigation of the Gulf of Mexico for a distance of more than two thousand miles. This route has been surveyed for a canal, by the engineers of the government of the United States, and it is certainly one of those necks of land over which a canal, if practicable, would be superior to a railroad, by reason of the directness of the passage, without the expense of unloading, land carriage, and reloading, with the consequent loss of time and interest of

money upon these changes. But being found to afford only an average depth of about four feet of water at all seasons of the year, and this being insufficient for the passage of sea vessels of even the smallest burthen, it may be well that the people of the United States should turn their attention to the construction of a railroad across this most important pass. For not only the trade of the Mississippi and Alabama rivers, and of the states of East and West Florida, now rising into great importance through the fertility of the land and advantages of climate, but also the whole commerce of Mexico would be brought across this peninsula, for the saving of two thousand miles of the most dangerous navigation in the world. For the gulf stream, though favourable to vessels bound from the westward, is so dangerous a track of navigation, through the extraordinary prevalence of lightning upon its course, with the darkness of the weather; and the difficulty of measuring the speed with which vessels of different degrees of burthen, and with different winds, are carried imperceptibly towards the reefs which abound along the Gulfs of Mexico and Florida; that, to avoid above two thousand miles of so dangerous a navigation, is an object most desirable to be gained by all the rich countries and islands beyond the peninsula of Florida.

The commerce of the Floridas, Louisiana, Mexico, and the northern islands of the West

Indies, all would be brought across this peninsula, and therefore an expenditure of many millions of dollars would be very amply repaid by the construction of a railroad across so important a pass.

The railroad to be formed from Lake Erie to New York and Boston, will also produce extensive results. For experience having shewn that railways, with foundations of wood, may be constructed for one thousand dollars per mile, it will no longer be required to preserve the canal navigation to the city of New York; and the canal may therefore be closed, and its level be converted into the site of a railroad to Boston—towards which harbour the course is direct. The advantage of the bringing the country of the lakes into the cheapest and nearest connexion with the Atlantic seaboard, will lead to a great extension of the agriculture of those cold regions, and the consequent improvement of the climate of the whole New England States. For we have seen already that the north-west wind is poured down upon those states with a severity which forms almost an arctic winter in countries lying in the parallels of the finest latitudes of the Mediterranean Sea. This wind, upon its passage to the New England States, travels over those immense inland seas — the Lakes Erie, Huron, Michigan, and Superior—the shallows of which present annually to the atmosphere, surfaces of

many hundreds of miles of ice. Hence the climate of the Canadas is increasing in temperature in a much more rapid comparative degree than that of the New England States, to which the north-west wind passes afterwards across those inland seas; and whilst the climate of Canada, from its steadiness, is salubrious in the greatest degree, that of the New England States is very prejudicial to life as was formerly described. Therefore the attention of the people of the United States might be most profitably directed to the embankment of the lakes within much narrower bounds. The deepening these waters, by covering over the shallower portions contiguous to the shore, would have all the effect which is required; for deep lakes, like the ocean, by giving out their caloric, render the temperature of the air more warm; whereas shallow waters are more rapidly exhausted of their temperature, and being converted into ice, continue to lower the temperature of the air which passes over their surfaces during the whole of the winter months. It is not the greater fertility of the land of the western states which so much invites the population which is poured out of the New England States, for that advantage is counterbalanced by the lower price of the agricultural productions of countries so remote, but the greater salubrity of the steady climates of the states beyond the Alleghany Mountains, which are not subject to be lowered by the changes of

the wind from the ocean to the land The improvement of the climate of the eastern states is therefore a most important object in the estimation of those who are aware how much a regular temperature of the air is concerned in the improvement of agriculture, and in the health, comfort and longevity of man. The Lakes, Erie, Superior, Huron and Champlain, all lie far above the level of the Atlantic Ocean; all have shallows of immense extent, and generally abound with islands, from which might simultaneously be carried on the operation of covering those portions of the surface with solid land. This narrowing of the waters of the lakes would also communicate rapidity to the waters of the River St. Lawrence, and this would further diminish the intensity of the cold of the winters of the New England States.

It must not be omitted to remark upon the error of that great line of railroad which is projected and about to be hurried forward from Nashville, in Tennessee, to New Orleans. The object of this line is to cut off the navigation of the Mississippi river, and to form a direct communication with the Gulf of Mexico at all seasons of the year. But, upon the view alluded to before, that the western states should direct their railways to the Atlantic Ocean, as the nearest route to the European and the northern states, it is clear, that to form a railroad six hundred miles

long, from Tennessee to a port at which the exports of that state would be two thousand miles further from the market, is the utmost of folly, when a line, of three hundred miles, may be carried to the eastward, in connexion with the rail-roads from the western waters to Baltimore, Charleston, or New York. The Mississippi and the Gulf of Mexico must be utterly abandoned, and the western states direct their roads to the eastern quarter of the Union.

CHAPTER XXII.

Pass across the Isthmus of Suez considered—A canal the best mode of effecting the communication between the Red and Mediterranean seas—An iron canal proposed—A marine railway —Calculations of revenue from the work—Steam navigation to the East Indies favoured by circumstances—Railroad from Bombay to Calcutta—From Calcutta to Canton—Great results to be expected from this work.

We now turn from the Western to the Eastern world, and first to the great pass across the Isthmus of Suez, from the Red to the Mediterranean Seas.

This project has long occupied the attention of the European states; and as the present government of Egypt is favourable to its execution, and the navigation of the Red Sea has been found to be practicable by steam, it now only remains that capital and science should be found for the formation of the work.

A canal would be here the most advantageous manner of passing from sea to sea, for the purpose of avoiding the expenses of unloading, re-shipment, and delay; but as the heat of the climate, and the shifting nature of the sands, have been considered adverse to that mode, some engineers have supposed that the

best method of constructing the communication would be by an iron road. But with regard to a canal, if the absorbent nature of the sand render the usual methods of puddling unavailing, it may be thrown out that an iron canal should be constructed for the purpose in this country, in a series of arched iron vessels, in an uninterrupted line. If the expense be not too great, of casting such a work, and sending out the parts to be joined in that country, then the absorbent nature of the sand would be finally overcome; and a very extensive degree of incorrodibility may be communicated to iron, for all aquatic purposes, by the impregnation of it with carbon, by methods which are now perfectly well known. Iron-work, for containing the requisite body of water, could very readily and cheaply be constructed in these kingdoms; and supposing the work to consist of an inverted elliptic arch,—which form would combine the greatest amount of surface and depth with the greatest strength of the work,—and estimating the iron at an average of four inches in thickness, and the span of the arch at ninety-five feet, with a depth of about twenty-two feet, thereby providing room for the passing of vessels of five hundred tons burthen, it would be found that the required weight of cast-iron could be furnished from the various iron-works of the kingdom at about a cost of about twelve millions of money for the whole distance from sea to sea.

If, therefore, an iron canal could be constructed of metal so durable as to be impervious to water even for ages, and the mere joining of this iron-work together in the sands of which the country is composed,—added to the cheapness of excavation, and future facility of being cleansed and repaired,—it may become worthy of consideration whether such a canal could not be beneficially constructed across this pass. Should the work cost altogether an expenditure of more than double the amount which has been named—yet, the saving of a navigation of ten thousand miles round the Cape of Good Hope, would enable vessels to pay a toll of 5*l.* per ton, and estimating the number of vessels which here would cross to and from the East Indies, and China, to England, France, Germany, Holland, America, and, indeed, all quarters of the world, to be five thousand a-year, or ten thousand paying toll upon passing and returning, and being of an average burthen of five hundred tons each, and the toll at only 1*l.* per ton, yet here is a revenue of ten millions a-year which thus would result from the work. This does not include that doubling of the commerce to China and the East Indies which the work itself would create; and, therefore, if even 50,000,000*l.* were required for the completion of the canal, yet that great expenditure would be abundantly repaid by the toll. The expenses of sailing round the Cape of Good Hope may be reckoned

at a greater amount by 4*l.* per ton for all the vessels which now sail to the East Indies: and estimating the saving of two months of time, and the consequent interest upon the value of the rich cargoes of tea, silk, and manufactured goods, which pass to and from the East Indies and China to all quarters of the world, it is clear that the annual saving of capital to the various European nations through this direct communication with the East, would amount to many hundreds of millions in the year. If the discovery of the passage round the Cape of Good Hope was one of the greatest discoveries of modern times, the completion of a direct pass from the Red to the Mediterranean Sea, would be a ten-fold greater event in the history of modern trade.

Should the project of a canal be abandoned, and a railway be the ultimate mode of achieving this pass, then the marine railway, becomes first worthy of consideration; for could vessels be here raised upon a railway and transported by locomotive steam engines across the isthmus, that assuredly would be the best mode of accomplishing the work. The railway should then be formed upon a series of elliptic arches; and the sand being an uncertain foundation, the whole work may be made to rest upon a solid floor of iron-work, when the sinking of the work would be uniform in every part, and no derangement of the level be caused by the insolidity of the sand.

Failing the marine railway, a common railroad for waggons would still effect a most extensive saving of time, hazard, and expense, as compared to the doubling of the Cape of Good Hope. A waggon might be then shipped at Bombay, and unloaded at Suez, passing thence to Alexandria, and again shipped for the port of Marseilles, and upon the railroad to England direct. Thus would this waggon and its contents be conveyed from Bombay to London without being unloaded, in about fifteen days, and at a charge of not more than about 7*l.* per ton; for the distance by this new route from London to Bombay, would be not more than five thousand miles. A waggon, therefore, could be shipped at Bombay, and be brought to Suez, a distance of fifteen hundred miles, in about five days; and one day being occupied in passing across the isthmus, and re-shipment at Alexandria,—and five days more being occupied in navigating the Mediterranean to Marseilles, a further distance of fifteen hundred miles,—and two days being sufficient for passing upon a railway of five hundred and forty miles from Marseilles to London,—the whole time consumed in passing from the East Indies to these islands would become reduced to a period of about fifteen days.

Indeed, through France to the Mediterranean at Marseilles, the passage by railways will be scarcely less important than the pass across the

Isthmus of Suez,—for it will cut off a navigation of two thousand miles round the coast of Spain, and through the Straits of Gibraltar,—thus passing in a direct line from England to the port of Alexandria; by which so great an amount of time, freight, and insurance would be saved, that a tonnage of 1*d.* per ton, per mile, or 2*l.* 2*s.* per ton from Marseilles to England, could be afforded upon the valuable cargoes of silk, tea, spices, gold, and other productions of the East.

Steam-navigation from Bombay to London will also be cheapened extensively by the opportune discovery of coals in Greece, and upon the Nerbudda, in the presidency of Bengal. For, by the existence of coals at the extremities and the intermediate position of the voyage, the necessity would be removed of carrying more than the consumption of a few days, or a quantity which might be contained in so small a space that the great difficulty of foreign steam-navigation would thus be overcome; for coals will be almost as cheap at Alexandria, when brought over from Greece, as at present in England, and at an equal price at Bombay, when brought from the Nerbudda, or perhaps from a nearer position, where beds of that fuel will undoubtedly be found to exist. Added to these advantages, is the calmness of the whole of the seas from Bombay to the Red Sea, and along the whole course of the Mediterranean, the entire track of navigation being

thus in the greatest degree favourable for steam-navigation from Europe to the whole Eastern world.

In continuation and connexion with this route to the East Indies, a railway may be formed across the Peninsula of India from Bombay to Calcutta, which is a distance of nine hundred miles. There is already a road across the peninsula, and the construction of one iron track would therefore be attended with a comparatively small expense. A direct communication with Bombay would cut off a navigation of three thousand miles between Calcutta and Great Britain, and a railway carriage of nine hundred miles could be supported by the rich products of the East. The whole exports and imports of the many millions of population upon the fertile plains of the Ganges would then be brought to Bombay, and the line from Calcutta to England becoming almost direct, this will redouble the facilities for emigration, and the consequent carrying out our laws, language, sciences, and arts, to the millions now subject to our power in the wide regions of the East.

Due west from Calcutta, at a distance of twelve hundred miles, and two thousand west from Bombay, is the city of Canton, the great trading port of the Chinese empire. In anticipation of the revolutionary changes which are evidently at hand in the celestial empire, and the probability that a much more extended intercourse with

foreign nations will become, at an early time, the policy of that people, it may not be visionary to foresee that a land communication shall exist from Canton, through Calcutta, to Bombay, and across the Isthmus of Suez to the Mediterranean,—thus cutting off a navigation of more than twelve thousand miles from China to Great Britain, and to all the European states. If the caravans of Russia now proceed by land from St. Petersburg and Moscow to the Chinese empire, over a distance of seven thousand miles,—it is certainly not unreasonable to anticipate the time when so industrious, ingenious, and wealthy a nation as the Chinese shall avail themselves of the invention of iron roads for the facility of reaching the European states. From Canton to Bombay, the conveyance for teas, silks, and other light and yet valuable articles of export and import, would be accomplished in a week; and the route would pass also through many rich provinces and cities of the celestial empire on the way.

CHAPTER XXIII.

Railroads as connected with the general question of free trade—Will be useless if monopolies be not previously abolished—Over-legislation the principal cause of national poverty and distress—Governments must be limited in their powers—The Post Office an instance of the bad consequences of monopolies—The corn laws discussed with reference to railroads—Shewn to be a great evil—Produce great derangements of trade, both at home and abroad—The importance of the landed interest over-rated—Manufactures the great source of national wealth—Probability that railways will transfer the ascendancy to France—The landed interest shortsighted in opposing the progress of manufactures.

But all these wonders can only be produced under a really free system of trade. If monopolies be not previously abolished, and the field opened to the full operation of the new system of locomotion, then better were it that the construction of railroads should be interdicted at once, than that the millions of people, whom they will bring into existence, should be the victims of that everlasting derangement of trade, and precariousness of the comforts of existence, which our present systems of monopoly and prohibition so extensively create. Millions already are starved, im-

prisoned, and destroyed through the operation of erroneous over-legislation; and let us not advocate the birth of other millions and tens of millions, if they come not unshackled into the world, and have not the right to pursue their labour, and obtain their happiness, how they will.

For there is scarcely an evil in the world, which governments do not indirectly cause to exist. Not that these miseries are intentionally produced by the governing powers, for there is not probably a wilfully evil-minded legislator in existence in the present age; and from despotism to democracy, all think themselves acting well for the people subjected to their rule. It is not tyranny, but folly, that desolates the world.

All that is required from our governors, is the discovery that their wisdom is foolishness; that the intermeddling legislator is the only enemy whom the science, enterprise, and labour of nations cannot overcome; and that governments are not instituted for managing the affairs of individual subjects of the state, but only to protect us from violence and fraud in the management of our own. No legislator can do good to an individual so extensively as his own self-interest will prompt him to benefit himself. Let governments repress violence, and discountenance fraud, says Mr. Burke, and then the less that they interfere with the affairs of the citizens, the better it will be. This is an invaluable maxim, conveyed in the simplest terms; and

yet no lesson has been derived from it by our legislators; for all is one wide scene of interference together in our private transactions; interference with our dealings in corn, in money, and every department of our trade. But all this must be removed, before any permanent prosperity, any well-secured accumulation of wealth, or freedom from the hazard of revolutionary changes, can be found in the land. The corn laws must be abolished; the currency left free; all prohibitions upon our foreign trade removed, before railroads, or any other scientific inventions, can be rendered a blessing instead of their consequences being turned into a curse through the errors of those who have undertaken to manage our affairs. Let us but toil without restraint, and we require no more; let our legislators tax us to their content, for their individual feastings and fine linen would form a small diminution of our national wealth, would our hereditary governors but content themselves to eat, drink, and be merry at a distance from the labours of the people; and discover that whole volumes of statesmanship are contained in the "*laissez nous faire*" of the merchants of Bordeaux.

Governments must be simplified and reduced in size. The repression of violence and discountenance of fraud, which Mr. Burke describes to form the only business of just legislation, can be effected almost entirely by the courts of law; and

mankind have no real occasion for the weeds, the lumber, and briars of the statute-book, and can exist in peace with scarcely any government at all. The Indian tribes who possess no regular government, were thought by Mr. Jefferson to obtain a larger share of the pleasures of existence than the civilised nations where the masses are perpetually subject to the violent changes in their condition arising from the derangements produced by excessive legislation. The cup of refinement is delicious, undoubtedly, but better were it that we never should have tasted it at all, if governments be engaged in perpetually dashing it from our lips.

To proceed to particulars; let us observe, and it is immediately connected with our present subject, the operation of the monopoly of the transmission of intelligence, which, through the Post Office, the government has violently taken to itself. Here laws are to be passed, to prevent the subjects of the state from carrying letters from one quarter of the country to another; and these laws are only required, because the rates of postage are a thousand per cent. higher than the sum for which the same transport could be effected by individual carriers, coach-masters, or others; and this additional charge of nine hundred per cent. upon the carriage of the intelligence of this great commercial nation, is required for the support of whole hundreds of supernumerary

functionaries, whose salaries of thousands a-year would be reduced to one twentieth portion of such sums if sent into the market to sell their labour and ability where they may. The intelligence of the country could be conveyed with equal regularity by individuals, who now, indeed, carry passengers and parcels in the same vehicle in which letters cannot be conveyed without paying nine hundred per cent. to the supernumeraries of the state. Thence the sum of intelligence is diminished, when letters are conveyed at a cost of a shilling, which could be profitably carried for one penny; and the profit, intelligence, and pleasures arising from the free inter-communication of the people are diminished through the influence of a monopoly which ought not to exist. It is clear that the government has no more right to the monopoly of the transport of letters, than of corn, coals, timber, or any other commodity whatsoever; and that direct taxation to the amount now gained by the Post Office, would be a saving of millions to the nation at large through the cheaper transport by individuals of the letters now forced through that painted public sepulchre, which is the only term by which the Post Office can justly be described.

The corn laws have immediate reference to the subject of this work. For we have seen that the prices of corn, and the consequent rental of land, is full fifty per cent. higher in England than

in Ireland; and that the manufactured commodities in which money usually is spent, are cheaper in a similar ratio in England, by avoiding the expenses of the exportation of grain, and importing of manufactures, to which the landed interest of Ireland is subjected by the intervention of the sea. Here, then, in England, is a body of men who have a double reward for the cultivation of the earth, and yet are clamouring for more protection against the importation of foreign corn, which in the nature of things must always be loaded with the cost of importing it to an island, and the double cost of carrying back the tools, clothing, and other manufactured commodities, without which corn cannot be cultivated anywhere in the world.

Then, too, it has been shewn that this state of things is occasioned by the presence of manufactures in England, and their absence from Ireland and the continental states. The masses assembled in the manufactories of Manchester, Birmingham, and Leeds, are the purchasers of the surplus corn which produces the rental of the land; and were those hives of manufactures suddenly swallowed up into the earth, then the corn-grower of England would obtain no higher price for his commodity, than the corn-grower of Ireland, Belgium, or France; and rents therefore would fall to the level of the neighbouring states, or less than one-half of their amount at the present

period of alleged overwhelming agricultural distress. Here is seen the fallacy of the argument that a landed interest is the staff and foundation of the power of the state. Had England no manufactures of woollen, cotton, hardware, and silk to export to the surrounding nations, but only the gross produce of the earth in the form of cattle, corn, potatoes, or wool, then the aspect of England would have been equally cheerless as that of Ireland itself; no accumulation of capital would have arisen, no favourable balance of trade with all foreign nations, no consequent double rental of land, no aristocracy supported in a splendour surpassing those of all agricultural countries, no ships, colonies, and commerce,—no wine and no gold could be brought from abroad in exchange for the cattle, potatoes, and grain of those landed proprietors, and no comfort, wealth, refinement, or abundance could exist amongst the great mass of the population of the land.

Thus we see the short-sightedness of the prohibitions which the landed proprietors would increase against the manufactures which are the true foundations of all their wealth. For to the invention of the steam engine is it owing that all nations are tributaries at our feet, and the supercession of that power which should enable other nations to manufacture at home the commodities which now must be brought from this country, would level all our superiority amongst the na-

tions, reduce the prices of corn and of land to the level of the continental states, and perhaps even carry us down to a second rank amongst the nations through the cessation of our export trade, and the dearness of corn, which then would be consumed by a manufacturing population in the nations abroad. Therefore, to pursue a policy which shall impede the prosperity of English manufactures, is not ungrateful only, upon the part of the English proprietor of land, but tending to the very destruction of his own right arm.

For with the rise of manufactures abroad the scale would be turned, the English manufacturer would no longer be enabled to surpass or even to compete with, the manufacturers of the continental states, then the balance of trade would be turned against this island, present accumulations would rapidly disappear, population would decay, the rental of land would be lowered by the corresponding poverty of the people, three quarters of the estates of the aristocracy would be abandoned to incumbrancers and their double prices of corn, double rents, double splendour, pleasure, influence, and power, as compared to the aristocracy of Poland, Germany, or France, would disappear, and be for ever at an end.

And yet these corn laws confer in reality no advantage in prices to the landed proprietor, which would not always be obtained under a perfect system of free trade. For the proprietors of

land would be benefited by the removal of the expenditure occasioned by the resistance to the spread of manufactures, which thus deprives great masses of the people of a field for the employment of their industry ; drives back the labourers of Ireland from the English manufactories, and then occasions millions to be annually expended for troops, police, hulks, gaols, and the ten thousand evils which are clearly to be traced to the fountain head of English monopoly alone.

The corn laws produce also the general enmity of foreign nations, limitation of intercourse, and obstruction to the spread of English science, enterprise, and wealth, which commerce alone can convey throughout the world.

To shew the dangerous consequences of this latter consequence of the corn laws, in the alienation of foreign nations, and that desire for our downfall which certainly exists amongst the agricultural states, let us here suppose—and the danger is indeed immediately at hand—that railroads shall be carried through France to the Mediterranean at Marseilles. At the present time, through the senseless and barbarous policy of ancient prohibitions, the French have certainly no chance whatever to compete with the manufacturers of England in the markets of foreign states; for the fuel of the country being of wood, and wood being three times dearer at Havre de Grace than coals at Manchester or Leeds, the steam power of

France can only be supported by an immense annual waste of the national wealth. But as the present order of things in France is evidently destined to endure only for a very short period of time, let us further suppose that no duty existed upon the importation of coals, and that the manufactures of the north of France were then supplied by railroads from the Belgic mines. The carriage of coals for an average distance of about thirty miles, would be an unimportant addition to their expense, and therefore the steam engines of France would be supplied with fuel at one-third of their present expenditure, and indeed upon equal terms with the steam engines of England, Scotland, or Wales. Then we have seen that railway transport will be infinitely less than that of navigation, and allowing that a railway be carried from the north of France to the Mediterranean at Marseilles, the manufactures of France would be conveyed direct to that port, whilst the manufactures of England must be carried to the same point by a voyage of two thousand miles, through the Straits of Gibraltar, to the various countries upon the shores of the Mediterranean sea. Thus the French, under the new system of transport, would manufacture their exports upon equal terms with the English manufacturers, and would have access by a railway in two days to the Mediterranean, and to all its shores, without the costs of navigation, insurance, and interest of

money upon the cargoes which would be frequently a month in arriving at the same destination from England by the sea. And not only to the countries upon the Mediterranean, but to the East Indies and China, France would have the same advantages over England, should the passage be obtained across the Isthmus of Suez at some early time. Here, then, the people of France would have the most decided advantages in the trade to the whole eastern world; and if no land communication be formed across the English Channel, or, being formed, the French should refuse to us the right of road, then the expenses of a circuitous voyage of two thousand miles even to our own dominions in the East Indies, would throw the ascendancy in future foreign commerce decidedly into the hands of France. Our insular situation would become a disadvantage, the sceptre would depart, and England would become, like Ireland, solitary amongst the nations of the earth. Seeing these changes approaching, through the rapid march of scientific improvements, it is the policy of England to remove all prohibitions upon the agricultural productions of France, and all foreign nations, that when the period of retaliation shall arrive, national animosities may have disappeared, and nations no longer have the disposition to injure the interests of one another. England is now in the ascendant, and, for her own present and future self-interest, should very evi-

dently disseminate the principle, that nations, like individuals, should love their neighbours as themselves.

Reason, self-interest, justice, and the common principle of benevolence towards the poor, require then that such broad violations of the rights of the people should no longer be preserved. There are other modes by which an aristocracy can be supported in their present abundance without so mean a taxation upon the loaves of the poor. The improvements in agriculture, the reduction of tithes, the substitute of the cheap spade for the doubly expensive horse, the introduction of railroads and the consequent cheap transit of corn, cattle, lime, fuel, and other requisites in agriculture, with the reduction of the prices of manufactured goods by the cheap food which the operative will then be enabled to obtain; these are the modes of enabling the farmer to pay a much greater rent even after the removal of the duties upon foreign corn.

CHAPTER XXIV.

The currency considered—Great importance of the question—The Bank of England a dangerous institution—Legislative errors committed with regard to it—The panic occasioned by the errors of the government and the Bank—Suppression of the one and two pound notes a great injury to the commerce of the country—The trade in money should be free—Free trade will always produce an abundance of the precious metals—No legislation required with regard to gold.

The trade in money must also, like the trade in corn, and all other commodities which money represents, be freed from the chains in which it has been placed; as if only to create poverty, misery, crime and revolutionary violence in the world.

For the history of the trade in money, or the question of the currency, as it is usually called, is one wide scene of legislative errors of the most fatal operation upon the affairs of this, and through this, of all modern states.

First, upon the principles which were pointed out in the commencement of this work, and proving the dangerous consequences of all commercial legislation, it was shewn that there is no enterprise which private bankers, or private traders of any other description, cannot accomplish from the capital of individuals in the present

day. Joint-stock banks, like joint-stock washing, milking and baking institutions, are not required, whilst there are the Drummonds, Hoares, Glynns, and Couttes', in the mercantile world; therefore, no such institution as the Bank of England ever has been required, or ought to have been allowed to exist. Its management has presented all the folly, irregularity, and waste of the other joint-stock institutions, with the exception that its operation having been upon a more extended scale, has been productive of injury to the community more than a million fold. Passing by the smaller considerations that such an institution, like all others of a similar class, can only be managed by the expensive machinery of directors, with hundreds of clerks placed in it by interest, and therefore at double rates of payment, and perquisites of many hundreds per annum arising from pens only once dipped in ink; these things, though paid for by an annual waste of the public money for the management of the national debt, which could be managed for one quarter of the expense if divided amongst the private banking institutions of the metropolis, are not more than one grain of sand, when compared to our folly in allowing this joint-stock institution to deal out to us what amount of money they in their wisdom shall see fit, and thus to hurry or to impede the wheels of the whole commerce of the world.

For this institution, through its monopoly of the circulation, has the power to make money plentiful or scarce; and this power, entrusted to men almost unknown, has been the principal cause of the panics, commercial vicissitudes, bankruptcies, broken hearts, gaols, incendiary fires, risings of the pauper population, precipitation of the aristocracy from power, and the general shaking upon their foundations, of all the institutions of the land.

First, this joint-stock company of bankers, in the year 1799, procured from the government, in the shape of a law for the suspension of cash payment, a violent absolution from their debts; and this inroad upon all justice was followed by those spendthrift issues of paper, which men would naturally put forth, who, by a connexion with the ruling power, were no longer in the wholesome fear of being taken by the throat

When this connexion was again dissolved, in the year 1819, the Bank of England, with all the incalculable profits upon baseless spendthrift issues of paper, and upon millions of the public money received for their services in the management of the national debt, could not now pay the gold which they had originally promised upon the surface of their notes, without withdrawing those notes in millions from circulation and buying up the gold to be found in all quarters of the world. This buying up of the gold and contrac tion of the circulation, by contracting the opera-

tions of the general commerce of the world, occasioned the distresses, and threatened revolutions of the years 1820, 1821 and 1822.

Thus, the passing of a law for the encouragement of spendthrift dealers in money occasioned a deluge of paper circulation, and afforded the means of slaughtering the people of the neighbouring nations; and next the return to an honest course, in the year 1819, occasioned that corresponding period of depression, misery and gloom, which the spendthrift is always doomed to undergo.

This return to an honest course, in the year 1819, was aggravated in its severity of endurance by the accompanying penance of an abstinence from the use of one and two pound notes. Perhaps, indeed, the change from extravagance to honesty, order and sobriety would have been effected without pain, if the Bank of England had not been compelled to provide gold for the compulsory withdrawal of their one and two pound notes; whether the public was willing to accept of them or not.

And after three years of suffering, danger, and alarm, arising from radicals, blanketeers, and Cato-street conspirators, all brought into existence through the derangements of trade, occasioned by the accumulations of gold in the Bank of England in preparation for the payment of the one and two pound notes to be forcibly withdrawn at a given

period of time, Lord Castlereagh, finding himself surrounded on all sides by the coming waves of revolutionary violence, repealed this compulsory enactment for the suppression of the one and two pound notes. Then trade instantaneously revived, the people returned forthwith to their work in the foundries and mills; Lord John Russell was laughed at when he brought on his annual motion for parliamentary reform; prosperity encompassed us with its wings, and the songs of rejoicing resounded through the land.

But this must not endure whilst there are the mischievous animals called statesmen, by the author of the "Wealth of Nations." Though now in the full tide of prosperity, the Bank of England redeeming its notes honestly in gold, and accummulation rising upon accummulation, till the powers of the fairy lamp of Aladdin were eclipsed in the bursting up around us of immeasurable wealth; our own population happy, Ireland even feeling the genial influence of the dissemination of our wealth, and foreign nations receiving, in floods, that English capital which opens out their resources and returns in redoubled streams to the country of the steam engine, yet must our statesmen proceed to turn this wealth into the pockets of the multitudes of those swindlers whose schemes were incorporated by law for milking, washing, mining, and baking of bread for the subjects of the state. Then the capital for these

robberies and follies was advanced by the imbecile directors of the Bank of England, and the nature of the schemes beginning rapidly to disclose itself, the directors who had lent too freely now took their debtors too suddenly by the throat, and then came the bursting of the bubbles, the panic, and all the long catalogue of miseries that immediately ensued.

Thus, the government, by sanctioning the joint-stock schemes, laid the snares in which thousands of the subjects of the state were ruined and destroyed; then the Bank of England being not directed with that providence and skill which private bankers must exercise, whose mansions, furniture, carriages, and plate will pass away from them if they give away their property to the projectors of baking and milking institutions, heedlessly seconded the folly of the government by furnishing the sinews for the joint-stock schemes, and then suddenly withdrawing, affrighted at their folly, overturned all within the reach of their operations, and this led to the fall of the schemes.

For if one great banking institution had not monopolized, by the force of law, the power over the circulation of the kingdom, its directors would not have possessed the power to lend imprudently, and to withdraw, with an equally imprudent rapidity, the loans so made; nor would these loans have been of one twentieth part of the amount, had not the whole of the circulation of the

kingdom been at the disposal of this one joint-stock bank. The nature of the joint-stock schemes would have been discovered by the private bankers, whose fortunes were more immediately at hazard if supporters of the milking and the baking operations; and though a few of the private bankers might have been ignorant of the principles of commercial legislation, and thus have been ruined by the joint-stock schemes, yet this is not the character of the multitude of bankers, and the failure of one or more private banking institutions would have subdivided the influence of the folly, which, in allowing one joint-stock bank to monopolize all power, renders their errors a thousand times more extensive in the sphere of the ruin in which they involve the subjects of the state; and which is again rendered more likely to ensue, because whether the management be for evil or for good, the directors of this great joint-stock bank are secured in their salaries, and are not, themselves, endangered in the wreck.

Thus we have traced the too celebrated panic to the doors of the bank. Had there been no Bank of England, there would have been no panic.

Then the government re-appears upon the scene This panic was only intended to be of a very temporary operation; for the accummulation of capital had been so prodigious in the three preceding years of a really free trade in money, that

the sweeping away of the projectors and their victims in the joint-stock schemes, was the effect with which it would have concluded in a very short period of time, had the government remained at a distance, and allowed the channel which just had overflowed its banks to regain its ancient course. But the step next taken by our governors was precisely distant from the right track of legislation as the pole is from the pole; the suppression of the one and two pound notes which immediately followed, having been the concluding blow to commerce and to themselves; for administration has been entombed after administration, and more administrations will follow after those administrations if they do not become wise in time, let the monetary concerns of the nation "alone," and untie the hands of the bankers again.

Thus far we have seen that over-legislation established this one great banking Juggernaut, which never could exist but to crush commerce under its unmanageable wheels—next that over-legislation passed the restriction act of 1799; then that the just legislation of 1819 was accompanied by over-legislation upon the subject of one and two pound notes; then that over-legislation brought the bubble companies into life, and when the panic arrived, and assistance was required, then over-legislation withdrew the one and two pound notes, and thus finally stabbed us to the heart.

For these one and two pound notes are the very soul of modern trade. They are wheels, small, certainly, in appearance, but which, in their rapid revolution, give impetus to the whole machine.

A banker is a dealer in money, and a government which forcibly debars the banker from following his occupation of lending money in the shape of one and two pound notes, is guilty of a tyranny, which affects not the banker alone, but all other traders of the state, who suffer in their commerce from the scarcity of money, which the banker is violently prohibited to lend. For the manufacturer, farmer, miner, merchant, all must be supplied with money in a condition of society in which barter is impracticable through the complex and wide spread machinery of modern trade; and if this supply of money be forcibly withdrawn, the establishments of these various traders contract in their operation, or fall to the ground. The manufacturer can only employ one half of the number of operatives—the farmer sees his fields covered over with weeds, while the labourer is wandering upon the road, because there is no employment for these labourers through the absence of money for the payment of their wages, through the absence of banking accommodation, through the absence of that money from the banker himself, through the compulsory prohibition of the one and two pound notes.

Bankers ought then to be no more subjected to

legislative restraints in their occupations, than merchants, manufacturers, butchers, bakers, washerwomen, or any other of the subjects of the state. If the public will receive their notes with a promise to pay them in gold, or without a promise to pay them in gold, and if those notes be one pound or five pound notes, or notes for five shillings, or one single shilling, or one penny, it is not the province of the government to prevent these voluntary transactions of the people, but only to open the doors of the courts against the property of the banker if he cannot, or will not, accomplish the payment of his debts. The banker should no more be the object of the surveillance of the legislature than the manufacturer, shoemaker, or the baker of bread; and it is not less unjust to prevent a farmer from selling less than two sacks of wheat, the nobleman from purchasing a less number of coach-horses than five, the butcher from selling a less quantity of meat than five pounds, or the baker less than five loaves of bread, than that the banker should be restrained from issuing notes of the value of less than five pounds to those who will believe him worthy of being credited on his promise to make payment in gold. Let the self-interest of the banker and his customers be the only guide in their transactions, and if either of the parties will not fulfil his engagement to his fellow-subjects, it is for the government to grant redress through a just ad-

ministration of the law, but in all other respects to interfere not with their transactions, and "let them alone."

But we are told that these one and two pound notes must be suppressed for the prevention of future over-trading, panics, and other derangements of trade. Our legislators must save us from ourselves; we know not what we do; bankers may fail and then our money would be lost.

To this it is replied, that the panic was created by our legislators themselves, they alone are the enemies from which we are solicitous to be saved, and bankers seldom would fail if not subjected to the crushing influence of one great joint-stock bank, and if the trade in money really were free.

By this violent suppression of the one and two pound notes, we have continued the consequences of the panic in full force to the present hour; we have preserved prices and profits at a rate at which general accumulation is at an end, we have narrowed the fields of trade, thrown thousands out of employment, and sent them to the gaol, the hulks, the workhouse, and the grave; we have wasted whole hundreds of millions of capital which would have been added to the national stock, and all these horrors have been gone through, for the prevention of the failures of banks, which, but for the interference of the government in their concerns, would not occur within a period of one hundred years.

To save the people from the possibility of one evil we have inflicted upon them evils a thousand times greater than any which could possibly have occurred; to prevent the operative from losing about twenty shillings by the failure of a bank, we have diminished his entire earnings to half the true annual amount; and lest he at some period should have not the wisdom to avoid a loss by the one pound notes, his whole existence is debarred of its enjoyment, his wages are diminished by the over-crowded condition of the market for his labour through the contraction of the commercial operations of the country, and thus his solid comforts are destroyed for the prevention of an evil which never might occur.

All then that is required at the present time, is to repeal this fatal act, and to allow the circulation of the country to consist of whatever money the individual subjects shall find convenient for their wants. The self-interest and judgment of the banker will prevent him from lending too much of his capital, since if he subject himself to loss, his mansion, park, carriages, and plate will pass away in punishment for his folly, and though some bankers may commit errors in their loans, yet the aggregate amount of benefit derived from banking operations is a thousand-fold greater than any temporary loss. Who would pull down his house, because of one unsound stone?

Nor is legislation, with reference to silver and gold, more justifiable than that which interferes with the bankers in the issue of their one and two pound notes. Let the banker provide gold for the fulfilment of his engagements wherever it may be found, for there is no reason to fear that there will not be abundance of gold in the world, whilst there is a corresponding supply of the commodities which gold represents. Gold is obtained by labour, and is abundant in the bowels of the earth, and therefore the supplies of food, clothing, and tools which England and other nations will always be enabled to send to the miners of Mexico and other gold-producing states, will enable them to exist whilst they are searching the earth in quest of the requisite supplies of gold thus demanded from abroad. There will be no deficiency of gold whilst there is abundance of blankets, pickaxes, and provisions, for the miners of Mexico and Peru.

Free trade is the philosopher's stone, and will turn all things into gold.

Thus the opening of the trade to China will increase the supplies of English gold. The exports of gold to that empire within the last quarter of a century, have exceeded more than 50,000,000*l.* from England alone, but now that the steam-engine has really found an entering point into that country, through the abolition of the monopoly of the East India Company, the

Chinese will become buyers of the fabrics, which, under the monopoly, could not be sold cheaper than their own, and thus the balance of trade will be turned, and these masses of gold will flow back into England again.

The sum of these views is, that if we cannot build our railroads upon a sure foundation, by the removal of the rubbish of legislation which has hitherto fallen in such everlasting masses upon all the preceding efforts of the capital, enterprise, and labour of the nation, then better were it that they never had been commenced, than afterwards be subject to the inroads of a government which has no principle of self-guidance whatsoever, and resembles a mere drunken man reeling to and fro.

It is clear that over-legislation is our greatest, and indeed, our only curse; for we have brought more miseries upon ourselves than though the armies of France had invaded these islands, and ravaged the length and breadth of the land.

Nor do our follies in legislation fall in their consequences upon this nation alone. From the position of England at the present period, the influence of our monetary regulations is universal in its operation, and the derangements of our commerce pass regularly through the whole chain of nations and are felt at the ends of the earth.

Thus the late threatenings of civil war in the United States, were, in reality, occasioned by as

simple a cause as the suppression of the English one and two pound notes. This measure lowered the prices in England of the cotton and other staple exports of the southern states, the low prices in England occasioned equally low prices in France, Germany, and the rest of the European importing states, this lowering of prices occasioned distress, foreclosing of mortgages and other ruinous consequences to extensive bodies of the people of the southern states, these attributed the low prices and their consequences erroneously to the tariff of their own government which had only a slight operation in a country where the smugglers could so readily find their way across a frontier a thousand miles long, and though the removal of this tariff has been one good consequence of the threatened civil war, yet the prices of cotton have not been raised, and never can be materially raised until the English bankers be really set free.

But at home the greatest convulsions must ensue through the increase of population, which, from our insular situation, will become accumulated in closer masses, and having no field over which to be diffused as upon continents where the land is not in universal occupation.

For the cessation of war has caused population to increase with overwhelming force; the numbers to be contended with are daily swelling in amount; and if trade, employment, clothing

and food be not provided for these multitudes, their weight will inevitably burst through an iron wall.

That this is the order of events is clear from the history of all populous states. The overflowing population of China is occasioned by tyrannical prohibitions upon trade, for no improvements in agriculture or manufactures are allowed to proceed, and navigation and foreign trade, in which millions of the people might be advantageously employed, are limited by the barbarous policy of exclusive commercial legislation. Thence all are forced upon the land for their subsistence, and twenty-two dynasties have reigned, and all been overthrown.

"China," says Montesquieu, "is subject to frequent famines. When the people are ready to starve with hunger, they disperse in order to seek for nourishment; in consequence of this, small gangs of robbers are formed on all sides. Most of these are suppressed in their infancy; others swell and are likewise suppressed; and yet in so great a number of distant provinces, some gang or other may happen to meet with success. In that case they maintain their ground, strengthen their party, form themselves into a military body, march straight up to the capital, and their leader ascends the throne." Here, with some modifications, is the circle of events now going forward in Ireland, Italy, France, and, indeed, three quarters of the modern states.

Thus see the state of things, at this hour, in beautiful France. Prohibitions upon the importation of the first articles of civilized existence, iron and coal, established for the benefit of the few powerful proprietors of iron mines and forest lands; wood, the only fuel to be obtained, and that fuel three times dearer than the English coal which is forcibly barred out; the manufactures of cotton, woollens, and silk, worked by steam-engines, of which the expense is three times greater than those of England, Scotland, or Wales; thence the clothing, tools, furniture, and all other manufactured conveniencies of the people, are three times dearer in price, and one third only can, therefore, be consumed. Then, in addition to the loss of two thirds of their clothing and utensils, for the benefit of the monopolists of the forests, is the succeeding loss of two thirds of their domestic firing, thus raised to three times the price in a country of which the winters are infinitely more piercing than our own; then follows the absence of employment, low wages, and accumulating poverty of a people increasing in numbers through the cessation of war, and impoverished through the absence of ship-building, navigation, and foreign trade, through the dearness of iron, which cannot be afforded for the composition of the mercantile marine; and by the general operation of a system, which spreads from the roots of the first monopoly through all the departments of the

industry of man. Then a meagre population, mud-built towns, solitary roads, and long lines of forests which are forbidden to be covered with wheat fields and vineyards, in order that the proprietors may sell fuel at three times its just price, are the disfiguring features of the whole scenery of France.

Then this suffering from hunger and cold renders disaffected, scowling, and ferocious, a population, whose natural character is polite, amiable, and gay; smuggling extends amongst the population of the frontiers; plots are perpetually moving about under ground in the capital and in the provinces and principal cities of a country where all are disaffected in one great suffering mass. Four hundred thousand men must be maintained under arms for the suppression of everlasting attempts at revolt; batteries are built over Lyons to overawe a spectral population; the national debt increases yearly in amount; and financial operations for its reduction are opposed because a portion of the owners of it are amongst the soldiers by whose swords this condition of things is alone upheld for an hour.

Then million after million of the remaining resources of the country is wasted in galloping, about with drawn swords amongst the Algerines, and in payments to the growers of beet-roots and other senseless substitutes for the first articles of a foreign trade: and thus an ignorant and an-

tiquated government is daily approaching nearer to the hour of its destruction; for the extending numbers of the population will suddenly burst asunder the chains in which they are now bound, and then the military system will be found to have no power against infuriated millions; and so the monopolists will be stoned out of France.

It is, therefore, for legislators to be wise in time. For the masses may be fed, clothed, and pacified, if allowed to labour without restraint; and there is no reason to fear that our numbers can be too great upon the surface of a globe, of which the diameter is eight thousand miles.

It is not taxation, if levied merely for its amount, and even if very exorbitantly levied, which does the great injury to states, for, if prohibitions be avoided, almost any weight of taxation may be borne by nations such as this. The country of the steam-engine, where the labour of four hundred millions of men is virtually obtained without food, and where those four hundred millions would soon be extended to thousands and tens of thousands of millions, if trade really were free, can support any government to the utmost satiety of the governing few. The monarchy, the law, the church, the army, navy, colonies, and a national debt of eight hundred millions of money, all can be borne, and the weight be not heavier than a few grains of sand upon the steam-engine, if there be only an unob-

structed revolution of the wheel. None would, then, attempt the overthrow of systems because of their expense. Close not up the fountain, but take freely from the stream.

The business of modern legislation is to diminish, to remove and symmetricize the shapeless masses of legislation that have come down to us from barbarous times. We must cease to suppose that there is any difficulty in just legislation. It is our besetting sin to fancy the difficulties of governing the world to be great, and we look into the clouds for that which is immediately around us and beneath our feet.

Seeing, then, that in the natural order of events the triumph of free principles is now inevitable, magnificent, indeed, are the prospects that are opening on mankind. Nations will become united in the golden bands of peace; science, liberty and abundance, will reign amongst the inhabitants of the earth; nations will no longer be seen to ascend and decline; human life will become refined and prolonged, years will become centuries in the development of the blessings of existence; and even now the eye can reach to the age when one language, one religion, and one nation, will alone be existing in the world.

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